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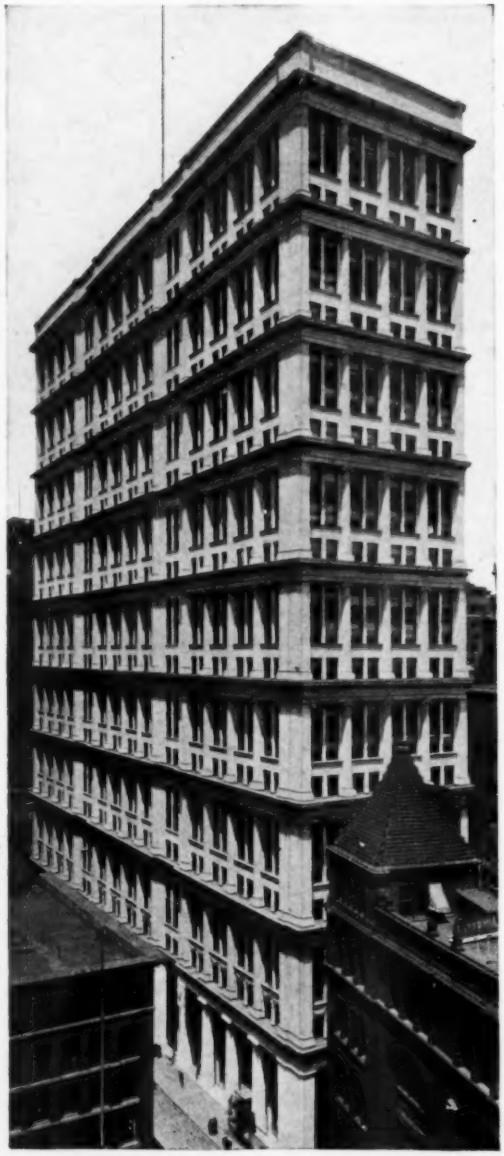

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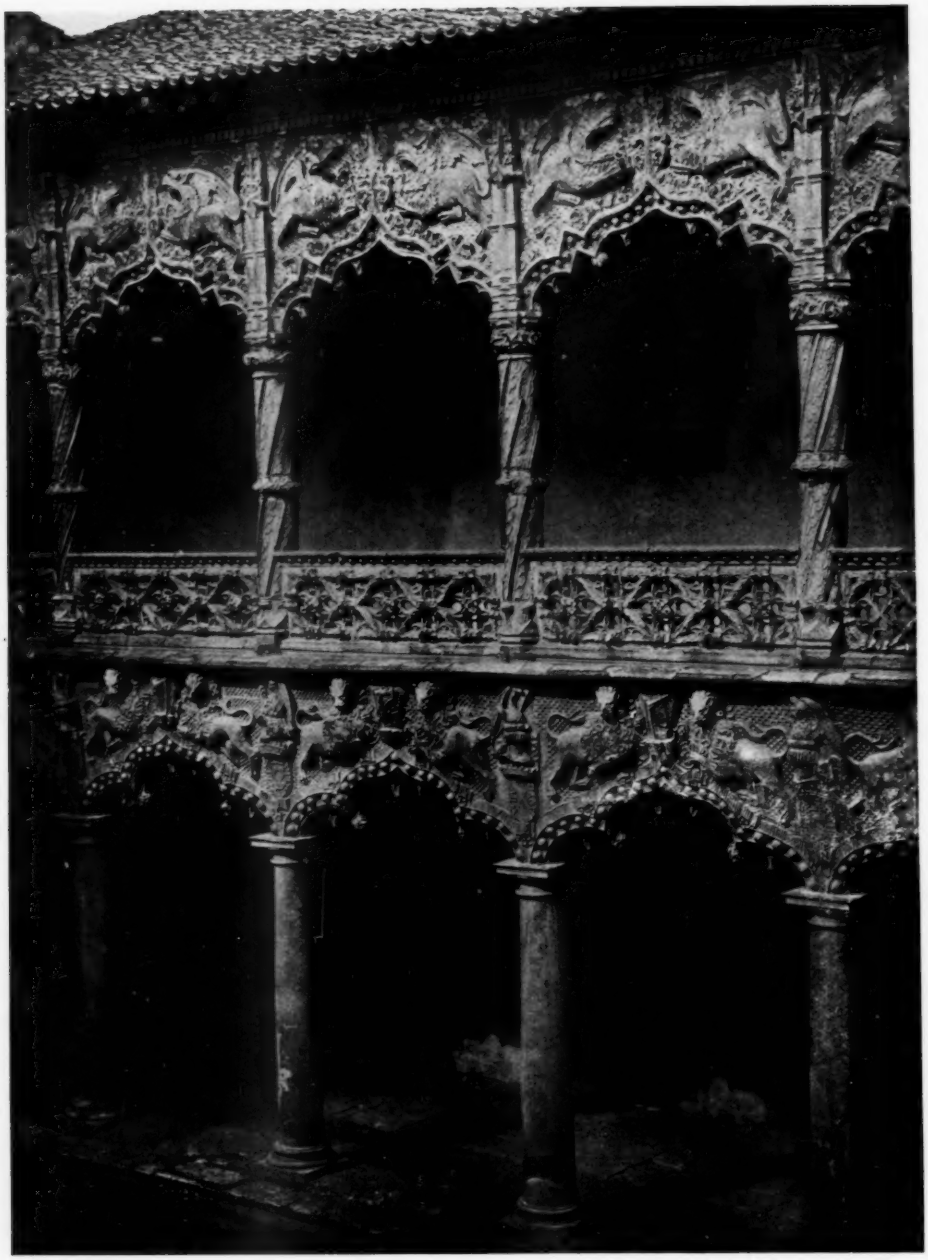

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THE AMERICAN ARCHITECT

VOL. CXIV WEDNESDAY, DECEMBER 18, 1918 NUMBER 2243

The Future and Influence of American War Housing Developments*

By C. STANLEY TAYLOR

THE sudden development of industrial housing in America, due to the tremendous pressure exerted by war conditions on manufacturing concerns throughout the country, was astonishing—even to experts who for years have been predicting that an industrial emergency would find the average manufacturer but poorly equipped in the essentials of labor stabilization. So interesting has been this development that there has seemed little time to spend on analyzing its effect on future activities along the line of providing good homes for industrial workers. Fortunately, however, there has been a wise tendency on the part of the Government and its advisers to provide generally a type of housing which must prove of exemplary value in the years to come. A precedent has been set in the design and construction of modest homes which, from the architectural and social viewpoint, may exercise a beneficial influence on this type of building for the next century.

Now that the war is over, a careful consideration of the changed conditions in the American industrial housing field is not only advisable but is actually necessary. The sudden proof afforded by war pressure of the important relationship of good housing to labor stabilization and production efficiency should so crystallize the interest of manufacturers and industrial communities that there is an encouraging prospect of continued activity in the field of moderate priced home construction. The outlook, then, in the industrial housing field is good; but there is danger of a reaction which would place in a most unfavorable light the entire activity of properly housing workmen, and cause a decrease in the newly aroused public interest in this subject, unless the future of the new war village is most carefully protected by wise administration and maintenance.

In the years immediately following the declaration of peace the fate of industrial housing as a matter of national interest among manufacturers and those engaged in civic development may be decided by the result of the Government's activities along this line. Whether or not the efforts of many years on the part of pioneers in the encouragement of the proper housing of workmen are to be nullified, whether the interested public is to become surfeited with the subject and impressed with its apparent failure, depends upon the administration and activities of the greatest single owner of workmen's houses in America—the United States Government. It must be realized, too, that if there is failure in any respect as far as the war villages, their present and future purposes, are concerned, the burden of failure will be placed upon the architectural and engineering professions under whose direction the work was done.

In brief review, we may consider that the housing of industrial workers has been exercising its effect (either beneficial or restricting as the housing was good or bad) since the earliest days of the manufacturing industry. The evolution of this important industrial factor may be followed in cycle, beginning at the point when the first industrial workers, those of the trades and crafts, performed their labor in their own village homes, carrying the finished product to a central point in the village or nearby town for distribution or shipment to other markets. Here living conditions were good, the pride of trade and craft was reflected in the work, and many of these old products are cherished to this day. In the next stage of industrial development the workers were gathered under one roof, and job

*A timely subject which should prove of general interest is opened up in this article. There can be no doubt that we have reached a critical period in the activity of properly housing industrial workers. The editorial pages of THE AMERICAN ARCHITECT are open for a general discussion of future policy in the administration, maintenance and ultimate disposition of the new war villages.

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routing and distribution was begun in a crude manner. Then came the gradual introduction of machinery, resulting in the construction of the great factories which drew the workers away from their healthful country towns to congested centers. These rapidly developed into unsightly factory towns, where living conditions became so bad that the physical and moral standards of the workers were almost universally impaired.

During the period of mechanical development and until recent years, the attention of manufacturers was centered upon the care and betterment of inanimate machinery. The well-being of workers, having a more indirect and less recognized effect on production, was almost entirely neglected. Gradually the mill and factory workers lost efficiency as the race declined. The reaction of slum conditions, impoverished homes and the disappearance of thrift and ambition among a large percentage of the working class became more and more apparent. Thus the demand for better living conditions among the working classes of England was recognized and through a semi-benevolent beginning the subject of better industrial housing has interested manufacturers, philanthropists, politicians, economists and last and greatest—the people. In Great Britain, garden village and suburb developments have been carefully planned and have been so successful in their benefits that before the war a similar movement had spread to almost all of the civilized nations.

In this country, prior to the war, the question of industrial housing had not been taken very seriously, except in isolated cases. In the mining and mill towns haphazard shack construction offered the poorest of living conditions for workers. In fact through careful analysis much labor discontent might be traced to the unattractive, unhealthful and in many cases immoral living conditions of the average industrial community. As the result of the activities of a few pioneers some good housing developments had been completed. Several attempts by philanthropists had unfortunately been diverted to more expensive building. Civic regulations governing dwelling construction and occupancies were becoming constantly more stringent and carefully considered. Some cities were cleaning out the worst slum sections, demolishing old tenements and sincerely attempting to better the living conditions of the working classes. The interest of manufacturers was being aroused through the activities of such excellent organizations as the National Housing Association and American Civic Association. Many were studying and considering—few were acting—when suddenly the outbreak of the European conflagration, followed by our entry into the war, gave to productive industry the greatest stimulus known in the industrial history of the world.

Labor then came into great demand; industrial communities almost overnight became crowded; rents and land values soared, presaging an unprecedented housing demand in these centers. Next came the cry for ships. Old shipyards, located in small, out-of-the-way villages, became scenes of intense activity and the need for shipworkers' homes became an insistent demand. New shipyards were established on deep water where land was cheap. This meant undeveloped communities. At isolated points great explosive plants were under construction and whole towns were needed to house the workers.

At shipyards, the housing need was met by the construction of thousands of good permanent homes owned for the most part by the Government. In a similar manner the need was met in large industrial centers and small but important manufacturing communities. In the isolated communities near powder and loading plants the need was largely met through temporary construction. In all, the housing needs of the Government have been met as well as could be expected in such a pressing emergency.

The danger, however, lies in the future of these villages and new communities. Will many of them become deserted villages after the war? If the demand for ships is cut down during the years following the war, what of the shipbuilders' towns? Will the great temporary powder towns and housing developments at isolated points be abandoned and allowed to degenerate into slums?

On the answer to these and similar questions depends future public opinion as to the question and merit of industrial housing. If we do have deserted villages and unsuccessful developments, the interest of manufacturers and of the public is in danger of being turned to condemnation, and the sound theory of industrial housing may suffer. If perchance there is unpleasant criticism of the administration of this new housing in after years, if there are serious financial losses and apparent wastes, it will indeed prove unfortunate in its effect on the interests of housing reform. Just at a time when we are wisely turning away from the cheap speculative builder of small homes—as we were restricting him and demanding that he give decent and better-built houses in exchange for a fair profit—that interest which was making possible such a change may be weakened through the object lesson of vacant indus-

trial homes at points where former activity may soon be forgotten; through the dissatisfaction of workman purchasers of Government built homes, or through faults of administration—and again at least 20 per cent of the national annual payroll will be spent for living quarters in slums, unsightly communities and speculative developments of poor character.

The question of the future of Government owned industrial housing is further complicated by a condition which may be not generally understood. A very large percentage of the various war material and shipbuilding plants for the employees of which Federal housing has been provided are not Government-owned plants. Therefore the individual condition at many of these points in the after-war period will be that of a privately owned plant where the labor need is falling off and the demand for the Government-owned houses is lessening.

The co-operative activity of the Government in converting war industries which are non-essential in times of peace, and placing such industries upon a sound productive basis, is looked forward to by reason of word from Washington that the War Industries Board is to be continued for this purpose during the period of reconstruction. Accordingly the very activity of the Government in assisting private corporations now on war work to become re-established in normal fields of production will have a good effect on the administration and disposition of the war housing.

It is the intent of this article only to arouse general discussion of the subjects emphasized. The full solution of the problem must be the result of co-operation, and a wise selection of those who are to administer the Government properties during the next few years. Following, then, are but a few simple suggestions which may open up channels of thought for those interested in safeguarding the advancement of better living conditions for American industrial workers.

Andrew Wright Crawford, Field Secretary of the American Civic Association, in a recent commentary on the standards set by the new Federal war cities and suburbs, sets forth the following well-considered thoughts:

"By appropriating $150,000,000 for housing, the Federal Government has accepted the responsibility for setting the standard for living conditions of the working people of the United States. Whatever it does, whether good, indifferent or bad, will be accepted as good enough by the real estate operators and by the mass of the people. The towns it constructs will be of enduring importance, not only for their inhabitants, but for the citizens of the United States generally.

"Housing, in its broader interpretation, means more than the way the house is built, its number of rooms, the amount of window space per square foot of floor or per cubic foot of rooms. It means the entire environment of the occupant and the occupant's family. Men and women are to such a great extent the product of their environment, and especially of the environment of their childhood and so many men and women live in such confined area and move in such ruts that housing is a chief determining factor in their lives."

Not only must a proper standard be set in the planning and construction of this housing, but also a standard in administration and maintenance. Many small but promising housing developments in this country have entirely failed in their real purpose because the manufacturer for whose employees the houses have been provided has failed to realize that the maintenance of an industrial development is of equal importance to its design and construction. Unfortunately, in these cases it seems to have been the general opinion that, having constructed the houses, nothing further was to be done.

This, then, is the first great responsibility of the Government in its administration of war housing after the declaration of peace: to set a high standard in management and maintenance which will result not only in the satisfaction of tenants, but in providing an exemplary precedent for those who are watching the outcome of this method of stabilizing labor. Even as men and women are the product of environment, so environment is the result of the combination of good physical conditions and proper civic administration. By proper maintenance of the war industrial developments, loss by depreciation can be kept low and the investment of the American people in better housing for the working classes can be safeguarded.

Second, great discretion must be exercised in the sale of this property at a time when the Government decides to unload some of its realty holdings acquired during the war period. Decision has wisely been made that none of this property shall be sold until at least a year after the termination of the war. This gives ample time in which to formulate a wise selling policy, and it seems particularly fortunate that the administration of this activity is apparently to be under the U. S. Department of Labor. The attitude of organized labor toward the question of industrial housing is fair and should act as an important factor in the final disposition of war housing. Organized labor wants better housing for workmen, and recognizes its value to them. The purchase of homes by workmen is not, however, advocated or encouraged by labor organizations, for

the obvious reason that from their standpoint the purchasing of homes has a tendency to overstabilize labor and render it less flexible for organization purposes. Organized labor also quite properly objects to a too academic application of housing and welfare reforms—in other words, the workman does not want methods of living and forms of recreation thrust upon him. In this, too, he is right.

The real service of a housing expert lies in a sympathetic understanding of the needs and wishes of future tenants. His buildings should be designed expressly for the people who are to live in them, in order that they may most happily carry on the routine of their daily life, not subjected to sudden and non-understandable new modes of living, but afforded the best facilities commensurate with the habits and inhibitions of foregoing generations, modified by contact with new surroundings. Improved modes of living can be gradually encouraged through the educational activities of a well-trained welfare worker.

The general attitude of organized labor in the matter of the purchase of homes by workmen could, I believe, be made broader and better reconciled with the home-owning instinct of every man by encouraging the purchase of homes in industrial communities where the location of varied manufacturing activities offers the possibility of securing other work in case employment in any one plant should fail for one of various reasons.

The question of the one-industry town is complex and worthy of careful consideration in its relation to the sale of houses to workmen. It is not fair to tie a man down through the purchase of a home unless sufficient guarantee can be given him that his work, and consequently his remuneration, shall continue without interruption.

Therefore, in its second great responsibility, the wise ultimate disposition of the war-built workmen's homes, the Government must set a precedent which will not turn labor, collectively or individually, against the sound policy of industrial home-owning but will rather encourage the determination of some means through which labor and capital may agree harmoniously in providing better living conditions for workmen and their families.

In general, the solution of this problem would seem to be some form of copartnership in which housing developments would be owned collectively by tenants. Such ownership should have as its basic principles:

1. Organization of owning and operating company.
2. Occupation of houses through tenancy agreement by stockholders only.
3. Elimination of speculative profit through a return to stockholders of all financial benefits accruing from increment in land values; privilege rentals and other sources of profit. This may be done through rental dividends; improvements to the property and stockdividends.

In such an operation common ownership involving the right of occupancy without individual ownership makes it possible for a tenant to leave without financial loss or delay; surplus profits accrue to his benefit; he has a better house and more land through taking advantage of the wholesale purchase of land and building materials; and a more sound investment is offered to capital needed for general financing of the project.

An interesting possibility is that of a copartnership organization to take over the entire industrial housing ownership of the Government after the war and to remain under Government supervision. The activities of this organization would include the management of all properties; gradual retirement of Government invested funds through private financing and the sale of stock carrying tenancy privilege in any of the developments to workmen. This plan has the following interesting aspects:

1. Guaranteeing the future use of these houses by an industrial population following the original purpose.
2. Offering wrokmen a flexible home investment in the form of stock carrying occupancy or rental privilege at many points throughout the country, or which could easily be disposed of in case entire withdrawal was desired. This plan should meet the approval of organized labor.
3. Offering sound inducement to private capital for investment which would retire Government funds.
4. Encouraging the location of manufacturing plants near such available housed labor supply. The activity of such plants would offset any decrease due to a cessation of war activities and would consequently guarantee the future of war villages, making each in fact the nucleus of a large model industrial community.

The co-operative or copartnership tenants plan applied to industrial housing is by no means a new idea. It has already been tried out most successfully in Great Britain and in a future issue of THE AMERICAN ARCHITECT a complete history of this method of operating industrial villages and suburbs, together with actual results, will be given.

This also suggests an activity of considerable importance which should be considered one of the principal factors in the administration of the Gov-

ernment housing projects after the war. That is, that in every way possible, private manufacturing plants should be induced to locate at these points where they may get the benefits of housing supply created by the Government for its war activities.

Many attractive permanent communities will have been constructed in the vicinity of shipyards. At some of these points, few, if any, private manufacturing plants are located. In most cases there are good rail facilities and means of water shipment. Raw materials of various kinds, particularly those used in shipbuilding, are easily available. The natural conclusion then is that these places would prove good locations for manufacturing plants of various types, in view of existing housing added to the various factors involved by manufacturing needs. It is difficult to predict what effect the cessation of war will have on the continued activities of shipbuilding plants. If our merchant marine is wisely maintained, this, together with some foreign demand, should guarantee to American shipbuilders a continued prosperity. Many of the cargo carriers constructed for the war emergency have been built for only a few years' service before overhauling and practical reconstruction will be necessary. It is, however, safe to predict that the present feverish activity of the shipyards will be lessened, in which case any tendency toward a vacating of new industrial houses may be counteracted through the relocation of manufacturing plants and other activities of labor-employment.

As a casual suggestion, there are at least three shipbuilders' villages which have come to the attention of the writer in which every new house provided by the Government could be sold for summer occupancy in case the need for workmen's homes no longer existed. This, of course, would be a condition brought about by the natural adaptability of the neighborhoods as summer resorts.

Where homes have been provided in industrial centers they will always be used for their designed purpose. In many cases these houses may be taken over by private manufacturing industries as nuclei of thriving industrial villages for plant labor supply. In all instances, they will serve the valuable purpose of taking the families of industrial workers out of slums and unhealthy, unsightly neighborhoods into better surroundings and introducing better standards of living.

When it has fulfilled its purpose all temporary housing should be destroyed!

It has been the constantly repeated history of temporary and shack construction that slum conditions soon set in. Shabby buildings induce shabby standards of living. When the activities of the great powder, shell and bagloading plants decrease there will no longer be the need of housing and these buildings should be scrapped. At the nitrate plants the conditions may be different. From all reports, it would seem that these plants, where operations are based on the recently developed air nitrate process, may be used for the wholesale production of nitrogen fertilizers. In such cases particular attention should be given the temporary housing as to the possibility of remodeling in permanent construction. At such points the possibility of the continued use of temporary housing is great and constitutes a particular menace. It will be a simple matter to procrastinate in the destruction of such buildings and to allow their continued use after they have too greatly depreciated. The unfortunate result of laxness in this matter would be the rapid development of unhealthy neighborhoods, too many of which already exist in mining and mill centers.

From the few points which have been outlined in the foregoing paragraphs, it should be evident that the Government has indeed accepted a great responsibility in constructing housing for war workers. While this has been more in the nature of a war emergency activity it constitutes nevertheless an experiment of great economic import, the extent of which is only to be realized in the years to come.

Mobilizing for Peace*

The Problems and Prospects of the Immediate Future

THE world is again turning to the arts of peace, joyous in the relief from the horrors and burdens of war, but uncertain as to the problems and prospects of the immediate future. That the economic, financial, and industrial readjustments of the transition period will be unusual and intricate is generally recognized, but the fact that victory entails discipline, reflection, planning, study and the exercise of all our accumulated wisdom is only beginning to dawn upon this nation. We are just learning what a famous contemporary statesman so aptly observed, namely, that "it is easier to make war than to make peace."

The transmutations of war are swift; a generation of changes has occurred in the last four years, and, therefore, it is not wholly surprising that to-day we should be startled by the growing realization of the vastness of the world's peace task. Lloyd George summed up the situation in a single sentence when he said "the whole world must be remade." Some conception of the immensity of the work at hand may be obtained from even a very brief and cursory consideration of a few of the salient results of the war.

The political problems need not be referred to; they lie outside the province of this address, and, besides, their analysis would require far greater wisdom than I pretend to. Suffice it for me merely to call your attention to these facts:

Through battle, atrocities and massacres it is estimated that 10,000,000 lives have been sacrificed; that $50,000,000,000 worth of property, not including the wastage of war material, has been destroyed in various ways; that the productive wealth of the belligerents, which in 1914 was computed to be $600,000,000,000, has now been mortgaged to the extent of more than $200,000,000,000—the estimated cost of the war. According to the Federal Reserve Board about $150,000,000,000 of the total war costs has been raised through loans by the various nations, and comparatively little by taxation. The enormous size of the world's present war debt is illustrated by comparison with the ante-war debt of the seven principal belligerents, which did not exceed $25,000,000,000. The cost of supporting that debt was only about $1,000,000,000 a year. Hereafter the annual burden for interest and sinking fund allowances will be not less than $10,000,000,000, and probably much more.

In the United States, during the nineteen months that have elapsed since that memorable sixth of April, 1917, when we declared war on Germany, there has been assembled and trained the largest army in this country's history. We have built up our navy until in tonnage it is second only to that of Great Britain. We have floated four colossal war loans, and we have voluntarily submitted to a system of taxation such as few other nations have endured voluntarily or otherwise. We have projected titanic commercial enterprises, as witness our merchant marine. We have temporarily turned over our railroads, telegraph and telephone lines to the Government. We have conscripted a large number of industrial plants, and we have regulated directly or indirectly practically every business in the country.

And now peace has come, and we find ourselves as unprepared for it as we were for war, although other countries, caught unawares in the maelstrom, have had forethought, even in the throes of a life or death struggle, to get ready for the inevitable readjustment when hostilities should cease.

To be sure the United States has emerged from the war stronger than ever, morally, industrially, and financially. Fortunately, we have escaped the devastation of the conflict, and we have suffered less in every respect than the other belligerents. In 1914 we were indebted to Europe to the extent of more than $5,000,000,000. To-day Europe owes us an amount in excess of $10,000,000,000. And, consequently, our readjustment problems are different in character and scope from those of the other nations involved in the war. They are, in the main, peculiarly our own; but, as a result of this we have few trustworthy precedents to guide us. We must blaze an original trail.

The problems of the European countries are those of reconstruction; our problems are those of readjustment, except in so far as we help Belgium and France and other former Allies to rehabilitate themselves. And it is to be hoped that we shall give freely of our superabundance of strength to that worthy cause.

Perhaps the most mooted question before us to-day is that regarding the continuation or decline of existing prices and wages. Opinions on this subject vary greatly. But one thing appears to be certain, namely, that the problems are fraught with unpleasant possibilities. An indication of such pos-

*Extract from an address by Francis H. Sisson, Vice-President of the Guaranty Trust Company of New York.

sibilities cropped out only a few days ago, when a prominent representative of employing corporations in manufacturing industries declared that the eight-hour day would have to be abolished and that wages must recede from their present level; to which the leader of a great labor organization replied with this note of warning:

"Our movement is not to destroy but to construct, and all may just as well understand now as at any other time that the advantages which the workers of America and the allied countries have gained and which we hope to extend even to the peoples of the conquered countries are not going to be taken away from us, and we will resist the attempt to the uttermost."

It would appear, however, that in this sharp exchange of ideas both the representative of employers and the spokesman of employes did not consider the most potent and really determining factor in the situation, namely, the basic law of supply and demand. The War Industries Board struck the true keynote in explaining a few days ago that it had abandoned the schedule under which grades and prices of shoes were classified from $3 a pair up to $12, because "increased production and competition are counted upon to regulate prices."

There can be no arbitrary reduction of wages to the pre-war basis. Were such folly attempted employers would suffer as much as employes, and capital as much as labor. That there will be a gradual readjustment is inevitable, but we should remember that for every loss there is some compensation. If wages are *gradually* lowered there will also be an accompanying reduction in prices; consequently, labor will lose none of the just advantages gained during the war, and of which no far-seeing employer would desire to deprive labor. But labor must accept its readjustment of dollar value like the rest of us.

Let us hope that America will be so busy from now on that peace production will be great enough to maintain wages at a high level. And let us hope also that employers and wage-earners will carry into the transition period and into the future for all time the realization, awakened by patriotism during the war, of their joint responsibility, and that they will perceive the wisdom and the blessings of industrial peace. The spectacle afforded by Russia to-day ought to be a lesson of what any other course may develop.

Maintaining High Wages

THE IRON AGE, commenting on the recent address of Samuel Gompers, states:

It was to be hoped that heated discussion of the labor questions involved in peace readjustments might wait a little. But Mr. Gompers was not to be denied the opportunity of clenching his fist and asserting vehemently that "the advantages which the workers of America and the allied countries have gained are not going to be taken away from us and we will resist the attempt to the uttermost." Mr. Gompers' outburst came in an address before the Pan-American Labor Conference at Laredo, Tex., and it was prompted, according to a press dispatch, "by a recent utterance of William H. Barr, president of the National Founders' Association, that the eight-hour day would have to be abolished and wages materially lowered from their present scale."

In commenting on Mr. Gompers' speech, Mr. Barr says that the president of the American Federation of Labor misinterpreted both the spirit and intent of his New York statement. We are glad to see that Mr. Barr now supplements his address by saying that all possible constructive energy should be utilized for co-operation and not for strife. "Perhaps," he adds, "the country can maintain its industries and secure its share of world trade on an eight-hour day basis. If so, well and good. No one would welcome such a condition more than the manufacturer."

Manufacturers and workmen are entering upon a period of readjustment, and that means many changes from what has existed in the period of the war. Manufacturers understand that war prices must be deflated. How long or how short a time that may require no man knows. Sooner or later wages in many employments will be reduced. The forces that will bring about these changes are beyond all Mr. Gompers' defiance, because they are economic forces and not decrees of any manufacturer or government or labor union. Mr. Gompers can no more resist them than he can control the rise and fall of the tides, or the precession of the equinoxes. He can no more hold wages where they have been in the period of the war than he can hold wheat at $2.30, or coal at double its pre-war price at the mine, or ship plates at $95.20 per gross ton.

So far as the eight-hour day is concerned, the war has not established it in American industries, though in many, including the steel industry, the

eight-hour measure has been established in computing a day's wage. Workers, whether union or non-union, have not insisted on limiting hours of labor to eight in the 24. Some of them even struck the other day at a Long Island plant engaged on Government work because overtime was stopped and they were prevented from earning more than eight hours' pay. But later the Government's order went out that overtime be stopped on all its contracts. That means that already the purchasing power of tens of thousands of workers has been reduced. If it should come about in the readjustments now going on that there were many more workers than jobs, it could easily happen that an employee who had been receiving 11 hours' pay for 10 hours' work while the war pressure was on, would be glad to get 10 hours' pay for 10 hours' work. There has been no eight-hour principle established, the eight-hour day being largely a means of getting increased pay.

Apart from any notice he may have meant to serve concerning wages and hours, Mr. Gompers' declaration that organized labor will not give up any advantages secured during the war should provoke no controversy or invective. Employers should not begrudge to workmen any better standing they have secured in an industrial democracy, or any larger participation in determining the conditions of employment. Notwithstanding that many employers have felt bitterly concerning the wholesale granting by Washington of practically all that labor asked in war time, it would be a mistake to carry over that feeling into the period of peace. The problems ahead of the country will not be solved right unless there is brought to their solution a larger supply of good will than has heretofore marked the handling of these issues. The spirit of employers should be conciliatory and not militant. Discussion of the labor aspects of the readjustment should be temperate and reasonable. It would be better, in fact, if such discussion were adjourned. Events are going to count far more in deciding the new industrial situation than any amount of argument or recrimination.

Shadows Cast by Skyscrapers

At noon, on the shortest day of the year, the shadows of different skyscrapers envelope large areas, states *Building Management*. The Adams Express Building, New York, which is 424 feet high, casts a shadow 875 feet in length; the Equitable Building, which is 493 feet high, one 1,018 feet in length; the Singer Tower, which is 540 feet high, one 1,127 feet in length; and the Woolworth Tower, which is 791 feet high, one 1,635 feet in length.

The effect of skyscrapers casting shadows from a sixth to a third of a mile in length on surrounding property is well illustrated in the case of the Equitable Building. Its shadow which at noon on December 21 is about one-fifth of a mile in length, completely envelops an area of 7.59 acres. The ground area of the Equitable Building is only 1.14 acres.

The shadow cuts off all sunshine from the Broadway façade of the United States Realty Building, which is twenty-one stories high. The New York Title & Mortgage Company Building, fourteen stories high, and the Washington Life Insurance Building, nineteen stories high, are both completely shaded. The south side of the Singer Tower is shaded to a height of twenty-seven stories. The nearest part of the City Investing Building, 400 feet away, is in shadow for twenty-four of its twenty-six stories. Even part of the New York Telephone Building north of Cortlandt Street is shadowed by the Equitable Building.

Cedar Street, the street immediately north of the Equitable Building, has an average width of 34 feet between Broadway and Nassau Street. The height of the Equitable Building is fourteen and a half times the width of this street. On a north and south street of this width in New York, uniformly improved on both sides with buildings having a height equal to that of the Equitable Building, only 9.31 per cent of the windows would receive any direct sunshine at noon on the shortest day in the year. On north and south streets only the windows nearest the top for a distance equal to 1.35 times the width of the street would receive direct sunshine at noon on December 21 at New York (40° North Latitude). The windows in the first thirty-four stories nearest the ground would receive absolutely no direct sunlight. Direct sunlight would only enter those windows in the four stories nearest the top. Not a single window within 447 feet of the street level would receive a ray of direct sunshine.

The Equitable Building is, of course, an extreme case. But even in much lower buildings a considerable number receive absolutely no direct sunshine at the winter solstice. Up to a height equal to 1.35 times the width of such a street all the windows

receive some sunshine. If the street, however, is improved with buildings one and one-half times the street width in height, only 90 per cent of the windows obtain direct sunshine.

Recent Legal Decisions

Abandonment—Acceptance of Work—Recovery

A building contractor entered into a contract with the owner to furnish material and labor and to remove the old and build a new front in a storeroom according to plans and specifications and was to receive therefor the sum of $725. After certain materials had been furnished and part of the labor performed on the contract, the contractor abandoned the work, the owner accepted the work done and the materials furnished, and completed the work at his own expense. In an action by the contractor the Oklahoma Supreme Court held, *Eckes v. Luce*, 173 *Pac.* 219, that he was entitled to recover for the work done and materials furnished according to the contract price, in the proportion that bore to the completed work, less the damages sustained by the owner by reason of the contractor's failure to complete the work.

Architects' Licenses—Sale of Plans

The California Supreme Court holds that the act St. 1901, p. 641, § 5, making it a misdemeanor to practise architecture without a certificate, applies to persons only and not to corporations, and does not preclude a corporation from doing an architectural business and engaging in the selling of plans and specifications where the plans so sold are prepared by certificated architects. The act is effective upon a corporation only to this extent that, if it undertakes to do business of that character, either the persons whom it engages therein must be certificated architects under the statute, or, when contracting for plans and specifications for the erection of buildings for other persons, such persons must be informed that the plans and specifications will be prepared by someone who is not a certificated architect. The main object of the act was to secure the erection of buildings from plans prepared by those who were sufficiently schooled in the profession to secure a license from the state board and who had complied with the state law by securing such license. But it was deemed best to qualify the absolute prohibition of the law by allowing the owners of property and persons who were not certificated architects to contract freely with each other for furnishing such plans and specifications, provided the person furnishing the same informed the owner that he was not a certificated architect. It is obvious that if such plans and specifications have been prepared by certificated architects, there could be no object in which the public are concerned which should prevent the sale thereof by the person who prepared them, or by someone to whom he has sold them. The act as a whole shows that it was not intended to prevent the sale of plans prepared by a qualified person, but to prevent their preparation by an unqualified person, unless the purchaser was informed of that.—*Binford v. Boyd*, 174 *Pac.* 56.

Mechanics' Liens—Accounting

In an action to foreclose a mechanic's lien, an appeal by the contractor from a judgment rendered on an accounting in favor of the owner involved only the question of the accounting. The trial court found that the contract price was $3,670, that there were extras amounting to $34.50, making a total on the credit side of the contractor's account of $3,604.50. The court then found that the owner had paid the contractor $500; that there were sub-contractors' and materialmen's liens amounting to $3,428.02 "and interest," and that the owner "was damaged in the sum of $472.05 on account of the failure of said A. W. to substantially comply with the contract." The lien claims were settled before judgment. The court gave judgment in favor of the owner and against the contractor for $472.05.

The contractor appealed and contended that the findings did not sustain this judgment. The Minnesota Supreme Court held that the amount for which the judgment was entered was not correct. The proper amount was to be arrived at by the simple process of taking on the credit side the amount of the contract price and the extras, and on the debit side the amount paid the contractor, the amount paid sub-contractors and the materialmen and the amount of the damages for non-completion of the contract. This left a balance in the owner's favor, but the balance was not $472.05. That was only one item of one side of the account. The contractor contended that the balance against him according to the figures found by the trial court was less than the amount of the judgment. So it would have been if only the face value of the lien claims as found were taken. But the trial court allowed interest on the claims, and this, added to the claims, would so increase the debit side of the account that the owner was entitled to judgment for a larger amount than was given him. The contractor could not therefore complain, the error

being in his favor. The claim that he was entitled to interest on the contract price could not be sustained. Interest does not commence to run in such a case until the contract is completed; and his contract was not completed.—*Westlund-Westerberg Lumber Co. v Lindsay* (*Minn.*) 168 *N. W.* 96.

Materialman's Stop Notice

An owner by letter requested one who had furnished materials to a subcontractor for a heating plant erected in an apartment house to give him the stop notice provided by California Code Civ. Proc., § 1184. The letter set forth to stop notice, which sufficiently described the property. The demand was served on the materialman's credit manager. The materialman failed to give the stop notice. In an action to foreclose a lien on the property by the materialman it was held, N. O. Nelson Mfg. Co. v. Rush, 174 Pac. 327, that he could not claim any lien on the owner's property for the materials furnished.

Substitution of Materials

If a building contractor has improperly plastered a dwelling house, necessitating replastering by the owner, the owner is entitled to have the plaster replaced with that required by the contract, and to be paid by the contractor, or to claim from him a reasonable sum for the expense so incurred; but he has no right to substitute a patent plastering for the plaster provided for in the contract.—*Drummond v. Hughes* (*N. J.*) 104 *Atl.* 137.

The Proposed Telegraph Hill Memorial, San Francisco, Cal.

A. Leo Ellis, *Architect*

As the light of peace penetrates the dawn of a new era, San Francisco has already arisen to announce that those who have paid the supreme sacrifice are never to be forgotten. At the great Heroes' Mothers' Meeting held in the Civic Auditorium on September 4th, 1918, in the presence of fifteen thousand people, San Francisco in spontaneous enthusiasm decreed to crystallize in material form that patriotic homage which links each state.

Mayor James Rolph, Jr., endorsed the idea of utility as well as beauty in the artistic conception to be realized. A project with this idea predominant knows no bounds. It should be a dignified, awe-inspiring composition with a style of architecture that lends its way characteristically to the application of a twofold purpose. The memorial as suggested is to be constructed on Telegraph Hill, and embodies a wireless telephone and telegraph station from which radio messages could be transmitted to all parts of the world, time wired to ships at sea, and longitudinal determinations made with scientific accuracy. The wireless would be of the umbrella system as suggested by General Claude Ferrie, commandant of the *Tour Eifel*, and who enthusiastically lends his support to this idea.

The mechanical equipment would be installed in the base, as well as a large solenoid for the purpose of scientific electrical research. The naval staff in charge would have their quarters and lecture rooms in the units connecting the great pylons. The steel tower springs from this point and sweeps one thousand feet upward with the memorial hall as the first unit and focal point of the composition.

Two elevators are the chief means of approach and exit of the memorial hall, ascending from the Grand Court of Memoirs inside the pylons. Every hero from the State of California would have his picture in a panelled wainscot directly under elaborate topographs, maps, photographs and transparencies relative to the zone of his individual activities.

A four-dial clock above the memorial hall would be seen from any part of the city.

Elevators carry up beyond the fog belt to an observatory 1350 feet above the level of the sea, from which point a powerful searchlight would render valuable assistance to mariners unable to see other beacons on account of dense fogs.

Telegraph Hill is the most conspicuous promontory in the city of San Francisco, 350 feet above sea level, with wonderful possibilities for the informal landscape setting suggested.

A memorial tower reaching up to such a height would in its dignity worthily commemorate the achievement of a lasting peace.

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Architecture and Industry

THE recent War Emergency and Reconstruction Congress at Atlantic City was the greatest meeting of the representatives of American industry ever held in this country. The unanimity of the opinions among the five thousand delegates must have its effect throughout the country. It was a convention dominated by a spirit of optimism and absolute confidence that the correct solution of the impending problems of the readjustment and reconstruction of industrial activity is assured. Politics did not manifest itself, and the recommendations for governmental actions were based on sound business principles.

Although the architects were given a place in the convention along with engineers, architects were not represented. The engineer was much in evidence as an integral factor in American industry, and assumed his rightful position as a directing influence in his field. The architect is a distinct and influential part of industry. The architect specifies materials of construction that involve the fabrication of raw materials into finished products. His plan directs and controls the placing of these materials in structures. These two processes involve labor and industrial organization of tremendous importance and are controlled and directed by the architect, hence the architect is an important factor in all American industry pertaining to building construction. Perhaps the aloofness of the architect is responsible for the assumption apparent at this meeting that he is not a factor in American industry. At this great gathering of the industrial clans, the architect utterly failed to assume his rightful position and assert his importance.

Those attending the convention realized the important influence of the engineer in every represented industry, and were duly impressed thereat. The best opportunity ever offered the architect to impress his importance to a favorable consideration has passed and again demonstrated the immediate necessity for effective architectural organization along business lines so as to enable the profession of architecture to secure that consideration which is vital to its success. It is certain that this consideration will be given to the engineer, and unless architects are more assertive of their professional prerogatives they will lose their opportunities.

To-day, more than any time in the past, the race is to the swift.

The Kinship of Humanity

IN the great struggle to make the world free to democracy, the kinship of humanity has become better understood than ever before. Whatever we have gained in the winning of this war has been purely the result of co-operation—the uniting in a spirit of concerted, unselfish effort for the accomplishment of a single, well-defined purpose. Thus nations and their colonies, separated by vast distances of land and water, have by co-operation in the field of action, in turn made possible by perfect co-operation in the field of united home control, effected the desired purpose.

In going steadily forward there has been developed that close relation which has evolved a mutual respect for one another's qualities, and thus the kinship of humanity has become more firmly knitted among the Allies than would have been possible through centuries of academic discussion and moral suasion.

As between nations, so between individuals, and those groups of individuals which form the mass of our economic population. Fired with the high patriotic purpose of winning this war, the several elements of our industries have laid aside the discussion of their differences, have ceased to declare their prejudices and have discontinued active hostility.

REVIEWING the relations of capital and labor, divisions that at one time were considered so irreconcilable as to demand an entire change in our social government, we find that there has been a

genuine effort to give personal service for the national good. All this has been brought about by the patriotic impulses that have enabled us to win this war. Now that the war is over, it is quite sure that we shall never return to former relative conditions between capital and labor, because each has learned its lesson, each has acquired a very great respect for the other. If it were possible to curb the activities of the demagogue, to muzzle the ranting of the agitator, we should be sure that we were steadily approaching a period when this conflict between two classes vital to our industrial well-being would cease. Whatever discord was in evidence during the war was due chiefly to these sinister influences. Labor, resolved to its elements, at no time presented unreasonable demands or in any way evinced a spirit not in harmony with the highest purposes of the Government. Unfortunately we shall have to combat that element in industry whose very existence depends on its ability to stir up contention. The spirit of patriotism was so great during the war that this element dared not raise its voice and could only work insidiously to gain its purpose. While the spirit of patriotism should at all times animate every man, there can be no doubt that it will be subordinated by private affairs when no great occasion demands sacrifice.

WHAT, therefore, is it possible to provide in times of peace for the stimulating enthusiasm apparent during a period of war?

Every patriotic man has set aside his personal aims to forward the winning of the war. This high purpose has been present in every walk of life from the humblest laborer to the richest and most influential man. What, then, in the way of impetus that would crystallize in an effort for the common good can be given to all the people for which they would in the future as unselfishly work as they have in the past two years? Would not a well-developed effort for true Americanization largely aid in securing this great brotherhood that would at all times be striving for the common good? All such effort would depend for success on perfect co-operation. Do we need any better example of the value of perfect accord, of the good results from "team work," than that shown by the Allies in the winning of this war?

Common danger, common effort and common suffering have developed a wide spirit of brotherhood. Must this great partnership dissolve with the signing of the armistice? Are we to cast aside all the lessons learned during the past two years, relapse to the days before the war, and again assume among the groups of industry that attitude of aloofness and distrust then so prevalent? Such action would be criminal. We are better acquainted one with the other than ever before, and with this closer relation, we should be able to find an impulse equally strong as that high patriotic one that led us straight to victory. No longer can the conception of industry as a private enterprise be maintained. No longer can capital sit aloof from labor, nor in view of what has passed will it attempt to.

THE first purpose of industry is to arouse social well being. The future rivalry between capital and labor to accomplish so well defined a purpose will be one of the great features of our progress. The man will render the greatest social service who will co-operate in these great events. There will not, and should not, be any distinction, and labor may well compete with capital in the furthering of so great an end.

This end should be our perfect Americanization. The "hyphenate" should disappear. Every man must either be one hundred per cent American or he shall be alien.

We have developed the greatest leaders in the fields of labor and capital, but there never was such an opportunity as now for leaders with the clear vision and broad sympathy that can be acquired only by knowledge of every grade and rank of workers in the industrial field.

This knowledge will not be for the purely political field or for the possibility of organization to control electoral results. Modern thought recognizes that the true basis of our national progress is the health, efficiency and spiritual development of the people. To secure these results, those who strive as leaders will have to be equipped with something more than the "shrewdness" at one time considered the most important characteristic of a leader of men. He who would lead, and there is as good a chance for a leader to rise from the ranks of labor as from the field of capital, must be equipped with an accurate and practical knowledge of all these things, and possess the ability to send them forward to fruition. He will arise as the result of our Americanization. He will be of no party but the great and single party formed by Americans, led by Americans, and striving for every ideal for which an American may stand. Such a man will lead a united people.

Here, then, may be a means to implant in every man's breast the same high and patriotic purpose that inspired him at the time when in his effort to help win this war he set aside every selfish motive and labored under the pressure of the greatest patriotic impulses. Until there is unity of purpose within the borders of this land there can be little

hope of successfully bearing a wholesome influence to other countries. It is pursuing the indirect course to attempt instilling the principles of democracy and self-development for which America stands across the seas, until in our own country these principles are not merely remote ideals, but actual goals which we constantly and eagerly aim to reach.

Criticism and Comment

"The Practice of Architecture"

The Editors, THE AMERICAN ARCHITECT:

In regard to your "Practice of Architecture," the paragraphs seem all to be well taken and clearly stated. The second paragraph, however, should be more carefully drawn, as there is need to state very clearly and concisely the duty of a professional man toward himself. The architect, after all, is of no consequence whatever, as it is architecture about which the public is concerned. A salesman may profitably praise his commodity but must very sparingly speak of his own ability.

The professional man who really produces a product in itself excellent seldom can remain unrecognized for long, whether he be a doctor, a painter, a lawyer or an architect.

There is a heavier duty to promote good architecture resting upon the client and the architectural press than upon the architect himself.

KILHAM & HOPKINS.

Boston, Mass.

The Editors, THE AMERICAN ARCHITECT:

We have given the items set out in your "Practice of Architecture" our careful attention, and beg to say that we believe that if these ideas were more generally carried out the profession would be much better off. We have for a number of years based our practice on just such principles, and have worked for years to create for ourselves just such an organization, and succeeded in securing one of which we are proud. The war has taken a number of our men, but we have been able, we are glad to say, to retain the principles in each department even though we have been obliged to sacrifice considerably in a financial way. We feel now that as there is a probability of being able to use them again, we made no mistake. We are in position to go ahead again under the same conditions under which we operated in the past.

We cannot criticize your statement, as every clause in it coincides with our idea of practice.

SANGUINET AND STAATS.

Fort Worth, Texas.

The Editors, THE AMERICAN ARCHITECT:

I have read over your "Practice of Architecture," and while I agree with everything you say, I feel that two or three additional telling paragraphs might be included. Of course I know that no condensed statement can cover the entire subject, but I am simply offering my suggestions for what they are worth.

After perhaps the fourth paragraph I would include the following:

"He must be solicitous of his clients' wants and must strive at all times to solve the problem from the owner's point of view.

"He must fully recognize that architecture means more than building artistically; that it means, to at least an equal extent, the solution of practical problems and the production of workable common-sense results which may enable the owner to carry on his work in the most effective manner.

"He must be co-operative to the last degree."

I think at the end of the fourth paragraph the following would be in order:

"By this is not meant the delegation of the power to deal with the problem in any manner whatever."

The above are the fundamentals of my own professional procedure, and as far as I have been able to observe, are often lost sight of.

ALBERT KAHN.

Detroit, Mich.

The Editors, THE AMERICAN ARCHITECT:

We are heartily in accord with the thoughts expressed in "The Practice of Architecture," printed in the THE AMERICAN ARCHITECT of November 27, or any other statement that will associate *business* with the profession of architecture.

In our contact with architects we have found them too much inclined to feel that their profession was to be practiced on a purely professional basis, eliminating business entirely. To our mind this is all wrong, as we cannot see wherein the business public can be expected to expend real money through the medium of an architect who is not

thoroughly equipped with good business judgment and ideas.

We have found that the business man, investing his money, wants to know that the architect is capable of expending his money in such a manner as to procure for him 100 cents for every dollar expended and at the same time produce a building that is a commercial success and to advise with him from this standpoint.

Therefore, we cannot see how the profession of architecture can be separated from commercialism, and we sincerely believe that the sooner the profession realizes this, the sooner the business world will appreciate that the architect is the true medium through which it can obtain the best results.

RUBUSH & HUNTER.

Indianapolis, Ind.

The Editors, THE AMERICAN ARCHITECT:

In reading over your article entitled "The Practice of Architecture" in your issue of November 27, it does seem at first glance as though it went a little far into the proposition. However, giving the matter careful thought, it does not seem to be very far from what would probably be expected.

Taking up the first paragraph, it certainly goes without saying that the profession of architecture is inseparable from the business of architecture; they are one and the same thing.

The second paragraph—general demand for the architect's service—that architects must individually and collectively employ proper and effective means to establish a universal appreciation of the value of architectural service, is a point which I have long held to be a vital thing, and I believe that the architect who has carefully studied his problem and taken into account not only the purely architectural effect of the thing he builds, but the practical use to which that thing is put, has by so doing been undoubtedly trying to establish an appreciation of the value of architectural service. I have preached that to such of my fellows as I have come in contact with, and this is one of the effective ways by which public recognition can be brought about.

The third and fourth paragraphs, as you have stated them, practically put the architect in the place of the contractor, and yet it is not very much more than every architect has been morally bound to observe to a greater or less degree. The great difficulty with this part of the proposition has been and will be the leaving of the architect free in the selection of materials and workmen. It may be that this thing can be brought about in the big centers, but in the smaller communities, in the outskirts of the big centers of business, under present conditions, this is absolutely impossible.

It seems to me also that architects when discussing the condition of the architectural profession, and matters pertaining to it, have not given consideration enough to the men who might be called the pioneers, the men who are situated in the small places where they have not much money at command, and are obliged to obtain whatever result they do obtain at a minimum cost, and where in small places they are hampered by that old idea that the carpenter and the builder are the practical men when it comes to building.

In the small town and the small city—and the small city is nothing but an overgrown town—that old feeling still persists, and the architect has a hard row ahead who attempts to combat it, and he is not able in many cases to get owners to leave to him the selection of workmen or contractors.

In my own practice it has been a constant fight in years past to confine the work to a few concerns of good standing and responsibility; oftentimes it has been absolutely impossible to bring this about, and the shyster contractor has sometimes been brought into the work against the wishes of the architect.

In a small city a great part of the architect's work will be of such nature that he must be thoroughly practical, that he must give his first thought to the use to which his building is to be put, and rely upon the simple treatment of his problem to achieve practical results, leaving the ornamentation or elaboration of design as a matter entirely impossible under the conditions. In consequence he is obliged to study carefully his mass and proportion, the detail being of minor importance.

It goes without saying that your last paragraph is a part of any decent man's business, whether it is the profession of architecture or any other profession, for in deciding controversies which come within his jurisdiction he must be just, and he must be impartial, or he is not a good citizen.

JOHN CALVIN STEVENS, *F. A. I. A.*

Portland, Maine.

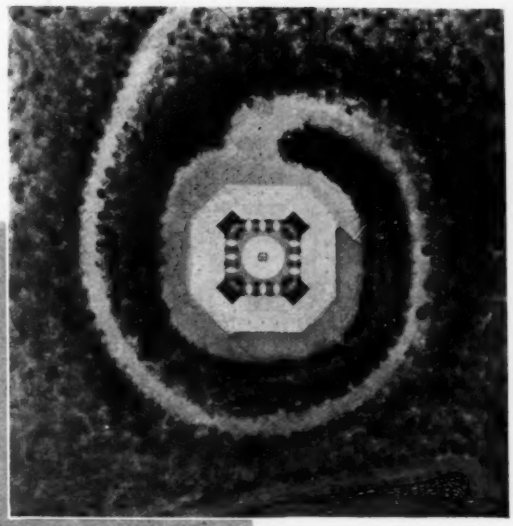
"Don't Let the Poseur Get You"

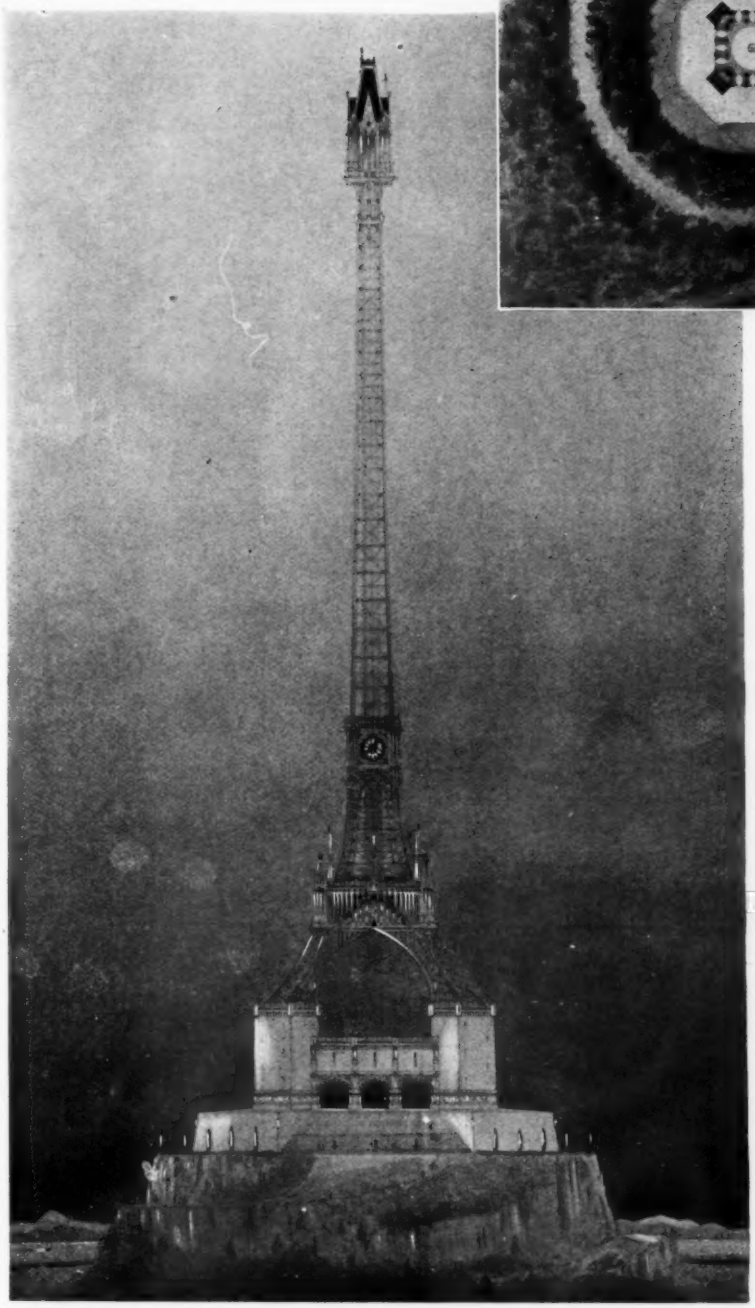
The Editors, THE AMERICAN ARCHITECT

The leading editorial in the November issue of *Architecture,* under the caption "Don't Let the Bolsheviki Get You," betrays such a grave misconception of the subject with which it deals as to demand a few words of comment in the interest of a correct estimate of existing conditions in the great industrial domain in which we are all more or less interested.

After a somewhat vague introductory reference to the restrictions which the code of the Institute

A. LEO ELLIS
ARCHITECT





ELEVATION OF
A PROPOSED
MEMORIAL
WIRELESS TELE-
PHONE AND TELE-
GRAPH STATION
FOR THE
UNITED STATES
NAVY
TO BE ERECTED ON
TELEGRAPH HILL
SAN FRANCISCO
CALIFORNIA

PLATE 186

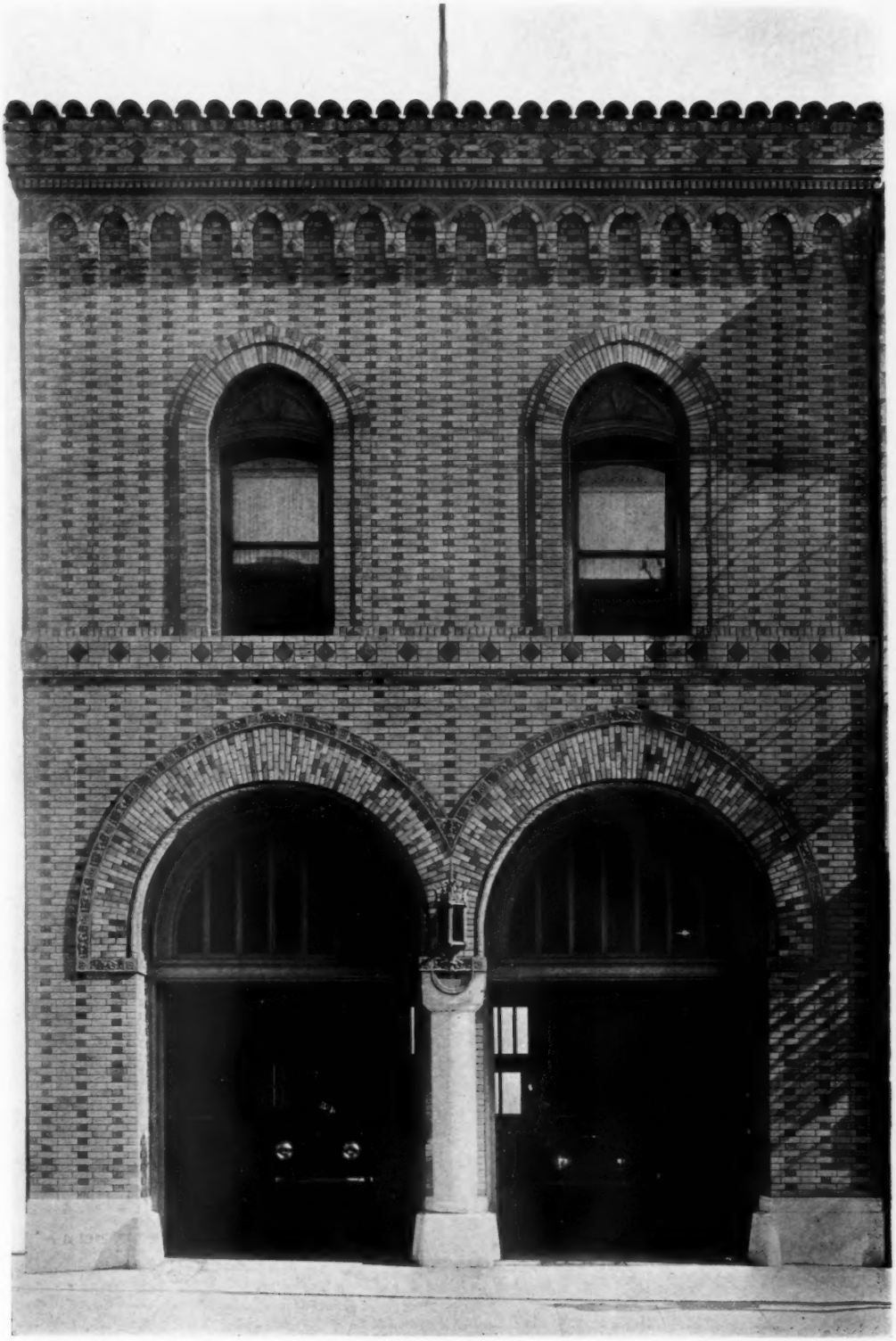


PLATE 187 ENGINE NO. 3, POST STREET

ENGINE HOUSES FOR SAN FRANCISCO, CAL., FIRE DEPARTMENT

WARD & BLOHME, *ARCHITECTS*

APPARATUS ROOM—ENGINE NO. 12

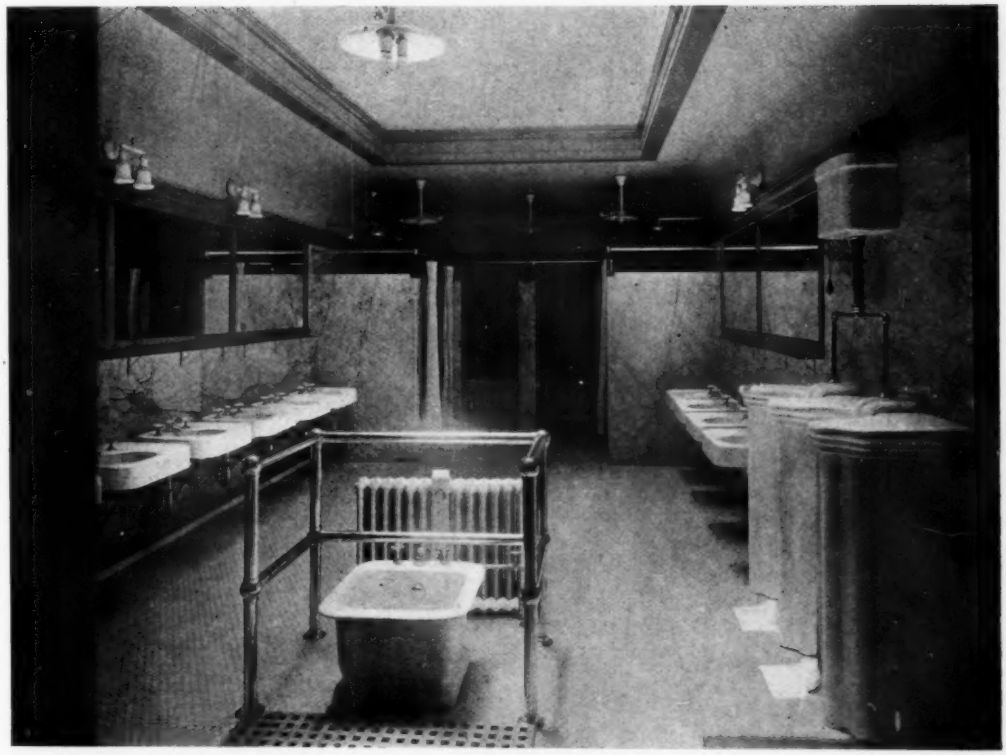


PLATE 188 LAVATORY—ENGINE NO. 12

ENGINE HOUSES FOR SAN FRANCISCO, CAL., FIRE DEPARTMENT

WARD & BLOHME, *ARCHITECTS*

PLATE 189

ENGINE HOUSES FOR SAN FRANCISCO, CAL., FIRE DEPARTMENT

WARD & BLOHME, *ARCHITECTS*

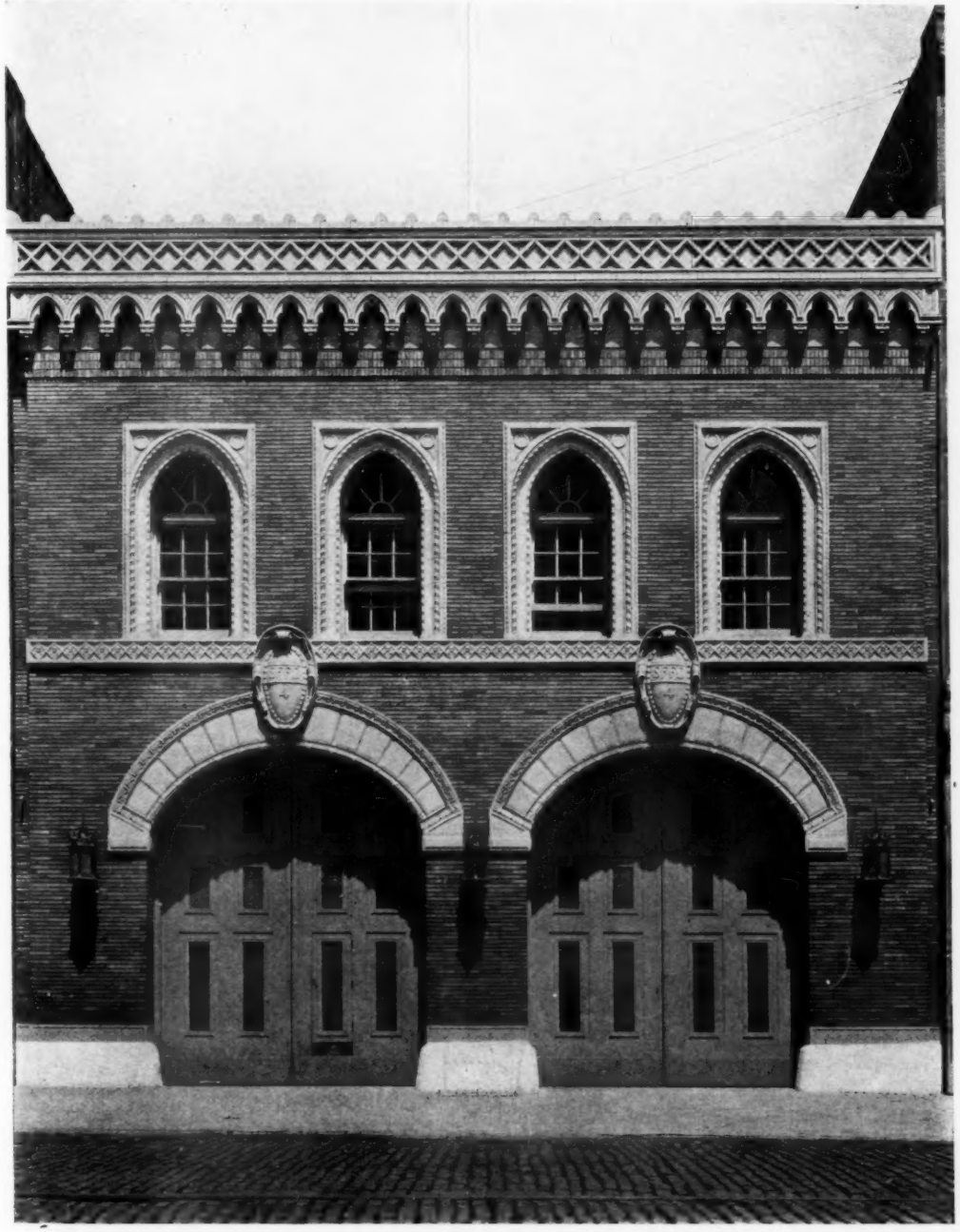
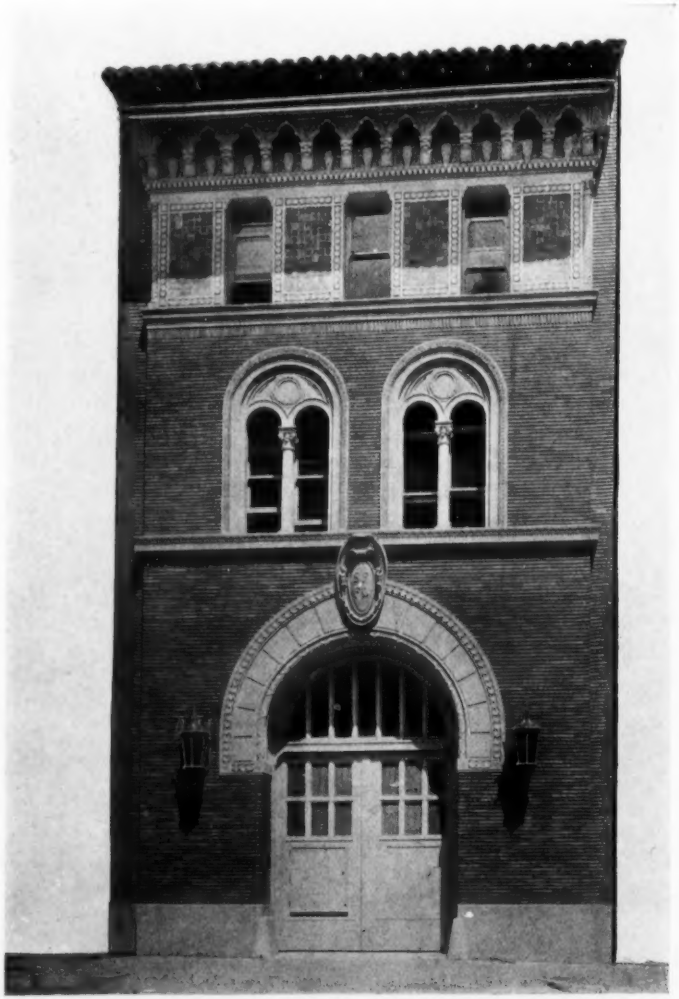


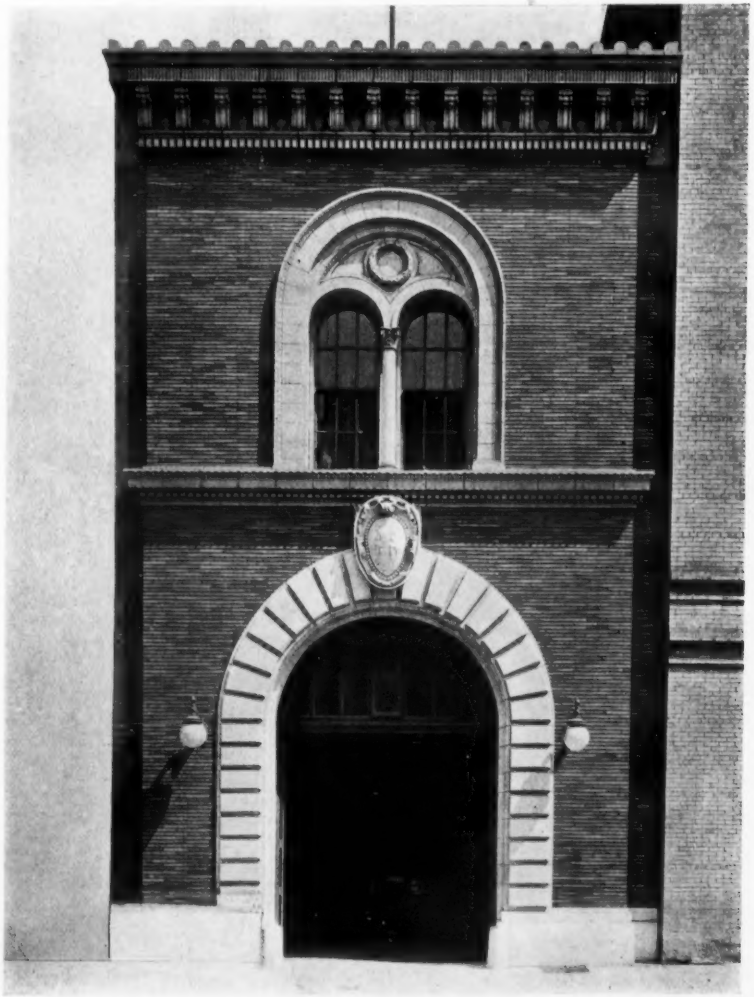
PLATE 190 ENGINE NO. 4

ENGINE HOUSES FOR SAN FRANCISCO, CAL., FIRE DEPARTMENT

WARD & BLOHME, *ARCHITECTS*



ENGINE CO. NO. 17—MINT AVENUE

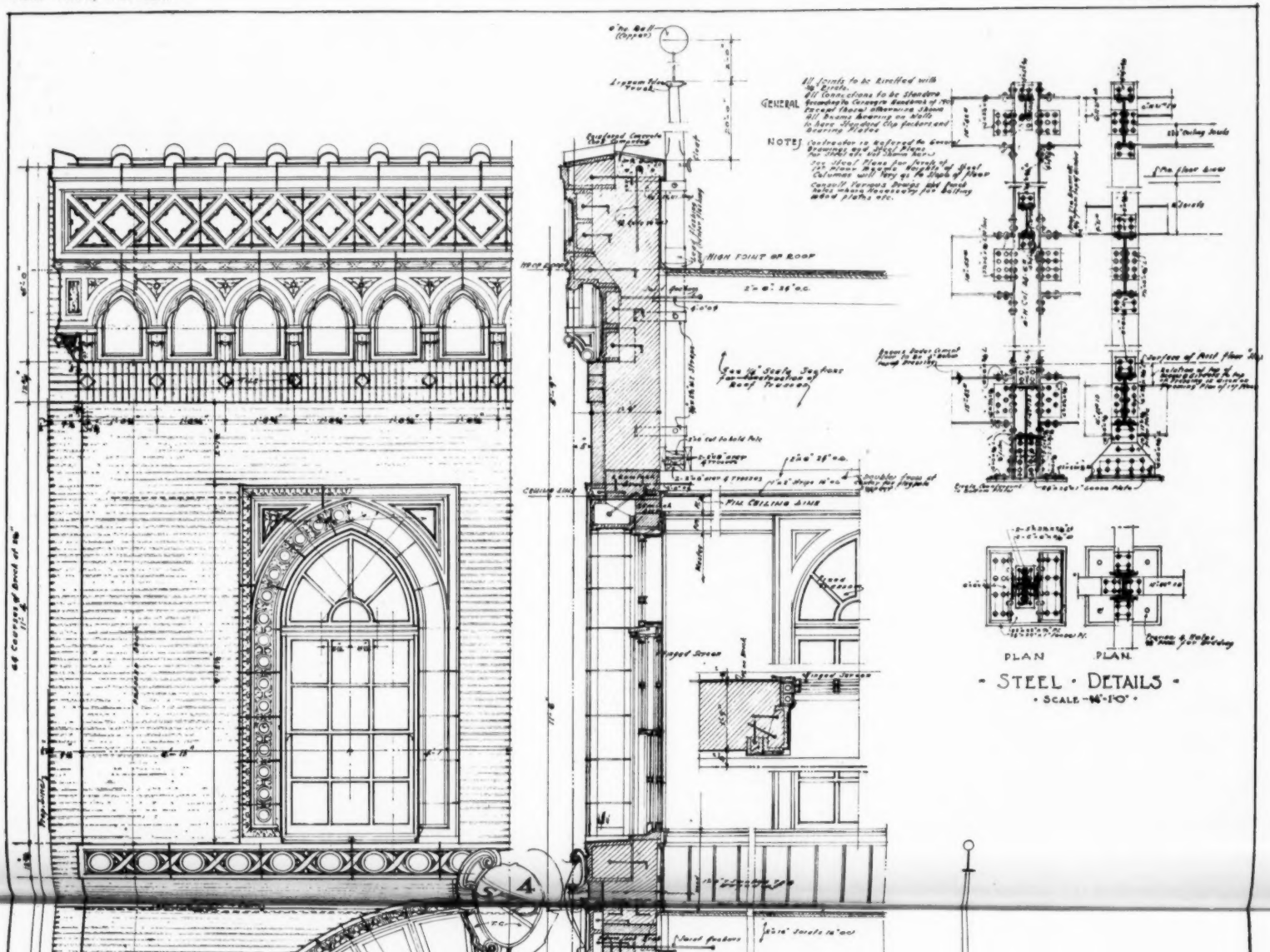


ENGINE CO. NO. 12—SACRAMENTO STREET

PLATE 191

ENGINE HOUSES FOR SAN FRANCISCO, CAL., FIRE DEPARTMENT

WARD & BLOHME, *ARCHITECTS*


GENERAL NOTES
HIGH POINT OF ROOF
PLAN
PLAN
- STEEL - DETAILS -
- SCALE - 1/4" - 1'0" -

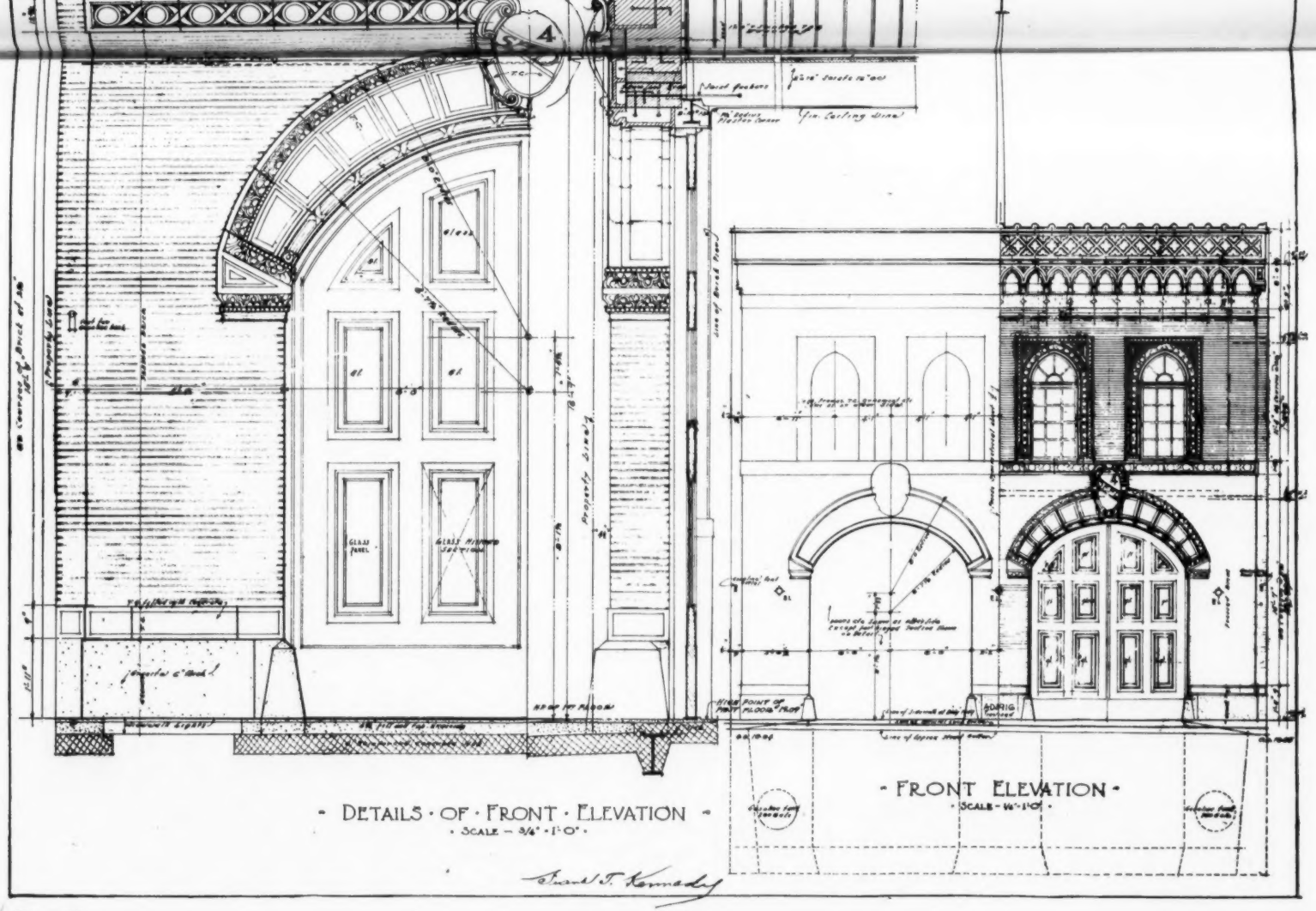
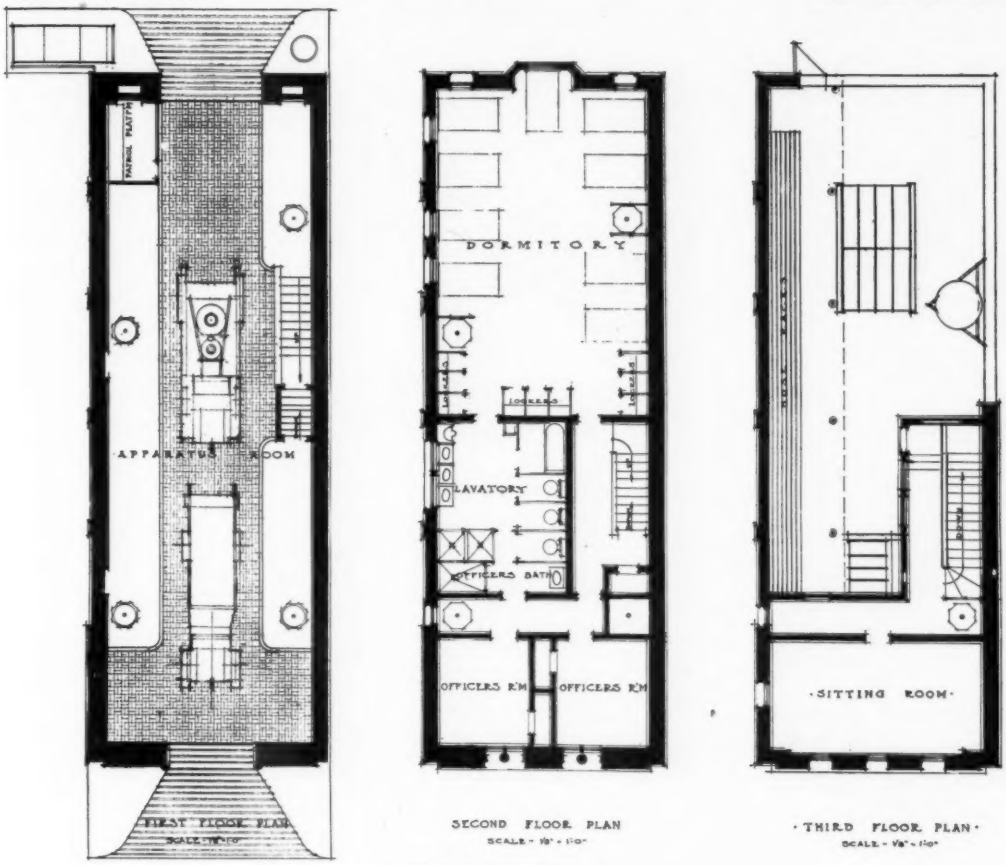


PLATE 192

ENGINE HOUSE NO. 4, SAN FRANCISCO, CAL.

WARD & BLOHME, *ARCHITECTS*



ENGINE HOUSE NO. 17

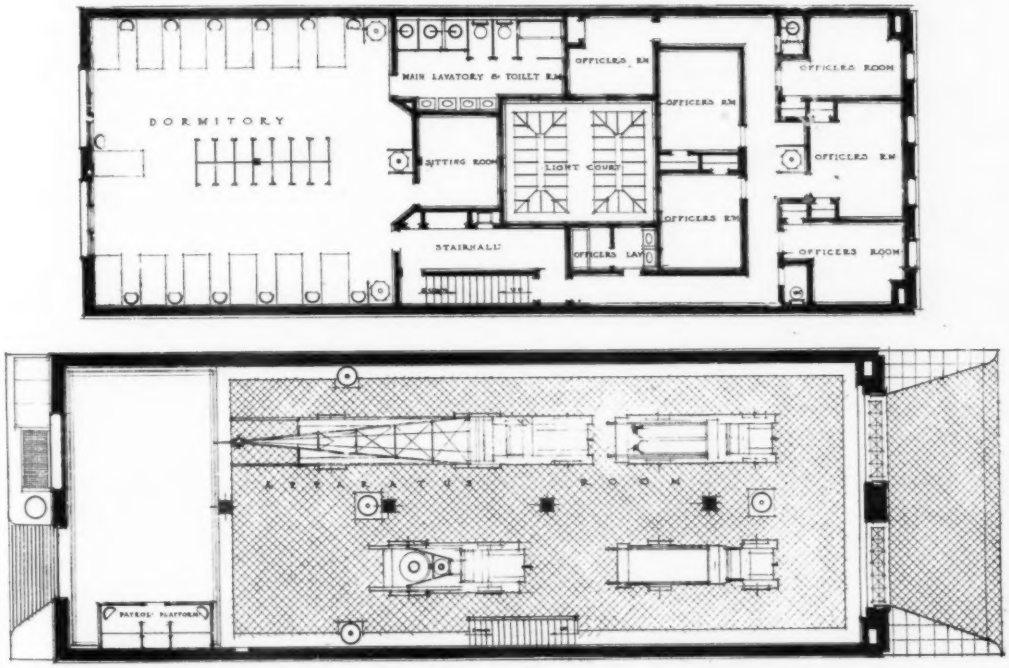


PLATE 193 ENGINE NO. 4

ENGINE HOUSES FOR SAN FRANCISCO, CAL.; FIRE DEPARTMENT

WARD & BLOHME, *ARCHITECTS*

imposes upon its members, the relevancy of which is not quite clear, the writer of the article in question launches forth into a panegyric on architecture considered purely as an art, deprecating its commercialization and the prospective degradation of the artistic soul of the architect to the level of the middleman and the pot-boiler. This is followed by the statement that there are hundreds of competent foremen and office assistants who can act as overseers during the erection of a building to one who can design a beautiful building. The conclusion from this and more of a like tenor is that "there is a Bolsheviki element in the arts as well as in other matters," and that we must be on our guard against making brokers of the architects, etc.

With all due respect to your contemporary, we claim that this is a sad case of misplaced emphasis. Far be it from the present writer to undervalue the æsthetic and ideal in architecture, or wherever these have a legitimate place. Well would it be, indeed, if this element were more in evidence than it is in the illustrated pages of our architectuural press. The fact remains, however, that the primary and essential thing in architecture is not beauty, but utility. In this it differs fundamentally from those fine arts whose ministry and appeal are to the intellectual, moral and emotional as distinct from the physical comforts and necessities of mankind. Perhaps the best definition of architecture is artistic building, with the emphasis on building. Take domestic architecture, for instance, which probably covers the largest field of any. Will anyone claim that the style and decorative finish of a house, interesting as these may be, are of equal importance with substantial construction, convenience of plan and compliance with sanitary laws? Does a man's comfort and happiness depend as much upon the style of his front door or chimney cap as on convenient and adequate access to his dwelling and a good, reliable draft in his furnace flue?

The same rule applies to every other class of buildings, with the single exception of those of a purely monumental character, which, of course, are in a class by themselves.

Whatever else goes to make an architect, he should be a man of affairs, in close touch and sympathy with the tastes and requirements of his fellowmen so far as they relate to the domain of building construction, or at least that portion of it in which he claims to be a specialist. When he quits this in pursuit of the merely beautiful and ideal he forsakes his legitimate sphere, if he does not end in being an impracticable dreamer. And here be it said that a too common source of trouble and embarrassment with men of this class, who cultivate the artistic to the neglect of the practical side of their profession, is their inability to give their clients a reliable estimate of the cost of their own creations. The result is misunderstanding, recrimination, lawsuits, ultimate discredit for the artist, and, perhaps, bankruptcy for the owner.

If practitioners of this type are to be the accredited representatives of the profession in future, small wonder if the architect is relegated to a back seat and his place largely taken by the civil engineer. Of this we appear to have had a sufficient premonition in the treatment accorded architects generally by the Government during the last eighteen months of war time.

Doubtless your contemporary would shrink from association with that section of the building public who are in the habit of referring to members of the profession as "architects"; but does not the attitude he has taken on this question suggest a perilously near approach to such a position?

It is no small merit to be able to estimate things according to their true relative values, and a blessing to be saved from grasping at shadows and losing the substance. It was long ago laid down as a canon of true art in architecture never to construct ornament, but to decorate construction. Take the corollary of this—viz., let sound construction and utility form the basis and controlling factor of all your artistic efforts—and you will be saved much misspent toil and misapplied, if honest, endeavor.

C. WHITLEY MULLIN.

Brooklyn, N. Y.

The Reconstruction Convention

ATLANTIC CITY, DECEMBER 3-6

THE War Emergency and Reconstruction Congress at Atlantic City was attended by about five thousand delegates, representing practically every American industry. It was primarily a meeting of the War Service Committee serving as representatives of American industries at Washington during the war. The convention was held under the auspices of the Chamber of Commerce of the United States of America. The congress opened with meetings of these War Service Committees, followed by meetings of thirty-five related groups, in which resolutions were introduced and from which they were passed on to ten major groups. The resolutions adopted by the major groups were sent to the Clearance Committee, meeting the evening of December 5. The resolutions approved by this committee were presented to the general session on December 6.

During these general sessions many important addresses were made. These addresses had a great influence in shaping the trend of the congress and were reflected in the tenor of the resolutions. John D. Rockefeller, Jr., in an address on the first day predicted the dawn of a new era. He said in part:

> Obviously the day has passed when the conception of industry as primarily a matter of private interest can be maintained. To cling to it is only to lay up trouble for the future and to arouse antagonism. In the light of the present, every thinking man must adopt the view that the purpose of industry is to advance social well-being rather than primarily to afford a means for the accumulation of individual wealth. It must be borne in mind, however, that industry cannot be successfully carried on unless not only the community and the workers are adequately served, but those whose money is invested are enabled to realize a just return.
>
> Might not the four parties to industry subscribe to an industrial creed somewhat as follows:
>
> 1. I believe that labor and capital are partners, not enemies; that their interests are common interests, not opposed, and that neither can attain the fullest measure of prosperity at the expense of the other, but only in association with the other.
>
> 2. I believe that the community is an essential party to industry and that it should have adequate representation with the other parties.
>
> 3. I believe that the purpose of industry is quite as much to advance social well-being as material well-being and that in the pursuit of that purpose the interests of the community should be carefully considered, the well-being of the employees as respects living and working conditions should be fully guarded, management should be adequately recognized and capital should be justly compensated, and that failure in any of these particulars means loss to all four.
>
> 4. I believe that every man is entitled to an opportunity to earn a living, to fair wages, to reasonable hours of work and proper working conditions; to a decent home, to the opportunity to play, to learn, to worship and to love, as well as to toil, and that the responsibility rests as heavily upon industry as upon government or society, to see that these conditions and opportunities prevail.
>
> 5. I believe that that industry, efficiency, and initiative, wherever found, should be encouraged and adequately rewarded, and that indolence, indifference, and restriction of production should be discountenanced.
>
> 6. I believe that the provision of adequate means of uncovering grievances and promptly adjusting them is of fundamental importance to the successful conduct of industry.
>
> 7. I believe that the most potent measure in bringing about industrial harmony and prosperity is adequate representation of the parties in interest; that existing forms of representation should be carefully studied and availed of in so far as they may be found to have merit and are adaptable to the peculiar conditions in the various industries.
>
> 8. I believe that the most effective structure of representation is that which is built from the bottom up, which includes all employees, and, starting with the election of representatives in each industrial plant, the formation of joint works' committees, of joint district councils, and annual joint conferences of all the parties in interest in a single industrial corporation, can be extended to include all plants in the same industry, all industries in a community, in a nation, and in the various nations.
>
> 9. I believe that the application of right principles never fails to effect right relations that the letter killeth and the spirit maketh alive; that forms are wholly secondary, while attitude and spirit are all important, and that only as the parties in industry are animated by the spirit of fair play, justice to all, and brotherhood, will any plans which they may mutually work out succeed.
>
> 10. I believe that that man renders the greatest social service who so co-operates in the organization of industry as to afford to the largest number of men the greatest opportunity for self-development and the enjoyment by every man of those benefits which his own work adds to the wealth of civilization.

Deep concern was caused by the news received from France, while the convention was in session, that the French Chamber of Deputies had abrogated all the most favored national treaties. President Wheeler on reading this dispatch made the following comment:

> "I can only regret, and I think every American business man will regret, that any such action was taken at this time by the Government of any nation which will be a party to the Peace Conference. It may happen that things will transpire at the conference which will make it mandatory upon the French Government to rescind this action of the Deputies, and that may cause trouble: It is always difficult to undo that which has been done, and it was so unnecessary for the French Government to take any such action at this time. This is no time for any nation which has been involved in this war to shut doors that might

better be left open. Once closed, some one might attempt to kick them in."

James A. Farrell, president of the United States Steel Corporation, speaking on the topic of our foreign trade expansion, maintained the belief that our existence as a nation depended on our active participation. He said:

"The task before us today in respect to foreign trade expansion is not so much to convince, as to advise and guide. Entrance into foreign trade is no longer a matter of choice with us. Everybody in these times is ready to concede the significance of the fact that the American industries presenting the most nearly unbroken record of prosperity and sustained labor employment are those which have been accustomed regularly to market overseas from 10 to 35 per cent of their products. Most men who think on the subject at all are prepared to go a step further and to concede that the production of commodities upon a competitive basis of cost, in amounts sufficient to supply home consumption and furnish material for foreign trade, will be the basis of our future national strength and prosperity."

Charles M. Schwab in an address that held the closest attention of the 4000 delegates present, said that the place for every big man in the country was at the helm of his own enterprises. Continuing, Mr. Schwab said:

"The real effort of the real American business man is still before him. We have faced and will face a great change in this social structure of ours. The change will not benefit the man of wealth and birth but the doer of things for his fellow man.

"The period of autocracy of capital and labor cannot obtain in the future. I sincerely doubt sometimes if labor has received its fair share of credit and recognition in recent years. We have got to devise ways and means to bring about a true democracy, so that the laboring man can hold up his head and say as you or I, 'I am an American citizen.'

"We must stand shoulder to shoulder now with labor, above all, to plunge ahead with the confident belief that the business of this country will go on and upward despite any condition which may arise in this country."

Secretary Redfield insisted that commerce must be a constructive force and never destructive. He said:

We must serve the world if we are to be on a safe foundation ourselves. The mere entering a foreign market by force of cut prices, or of off quality goods, or by "dumping," or by untruthful advertising, or by force of Government aid or political power is in no true sense commerce, nor will it last. We must learn the evil lesson from those whose power we have destroyed. We must carry the flag as high in the commercial world as we have carried it before our armies. It means that we are going to play the game like gentlemen and make our methods such as shall survive because they render service.

"That means that we must sell goods that others want and not unload those of which we would like to be rid ourselves. It means that we must win upon our effectiveness, not upon our hustle; that we must carry our business far because it is right that it should go far upon its own merit. It means a lot of forgetting and a lot of learning on the part of many of us."

The United States must not only be ready to supply its Allies with the goods they need to make reconstruction possible, Mr. Redfield asserted, but is also must play the part of the tolerant creditor and extend to them additional financial aid so that they will be able to purchase these goods.

It was an optimistic convention and indicated the confidence of American industry in the future and in the ability of the country to readjust itself quickly and satisfactorily to post-war demands. Of the hundreds of resolutions referred to the Clearance Committee, thirty-five were reported out to the general session for action, and all were unanimously adopted. Probably the most important resolution was that one indorsing the ten points pertaining to capital and labor printed above, as proposed by John D. Rockefeller, Jr. In fact, the relations of capital and labor were more thoroughly discussed during the convention than any other subject, and the present viewpoint of employers would not have been considered possible a few years ago. It bespeaks a rational and successful solution of these problems in the future. There was a strict elimination of politics in the resolutions which denotes the broad and open mind of the convention and a strict attention to the business of the congress—that of reconstruction to a basis of normal conditions, affected by the changed world relations of the United States resulting from the war.

As would inevitably occur in a convention so large in number and composed of so representative a body of men, many valuable ideas were developed as part of the proposed program to be adopted.

Among them were:

A commission to be sent to France to represent business men during the session of the peace conference.

Modification of the Sherman anti-trust law.

Restoration of the grain trade to the status it had before the war and the removal of restrictions regarding production and distribution, giving dealers, shippers and millers the same protection as producers.

Making of a strong appeal for loosening the hold the Government took over business during the war.

A demand for a great merchant marine.

Retention, through voluntary action, of some of the regulations enforced during the war to prevent waste in production. Incidentally the conservation of raw materials.

A protective tariff on sugar to protect the American beet sugar market and make it independent of foreign crops.

Maintenance of a foreign trade commission and the collective purchase of raw materials in foreign markets.

Related Group 33 embraced engineers, architects, accountants, specialists, and held its meeting on the evening of December 4, at which J. Parke Channing, Engineering Council of New York, was chairman. This group meeting was attended by engineers, attorneys and representatives of the National Association of Real Estate Boards. Architecture

was not represented by any delegates. D. Knickerbocker Boyd, of Philadelphia, was present, representing the U. S. Housing Commission of the Department of Labor. While the number of engineers attending this group meeting on their own account was small, it was estimated that at least three hundred engineers were in attendance at the convention as representatives of many industries, and exerted an important influence in shaping the action of the convention. Engineers of national reputation were everywhere in evidence, and their influence and power was everywhere apparent. Architects, however, were not noticeable in the greatest gathering of American business men in our history.

The discussion in this group covered a wide range of subjects, of which the attitude towards labor again received the greatest attention. William M. Garland, president of the National Associated Real Estate Boards (composed of 155 local boards), described the work of the board in making the purchases, leases and sales of real estate for the Housing Divisions of the Department of Labor and the Shipping Board. He advocated that the Government cease all operations for housing workmen at once and that all such properties be disposed of to the best advantage. It was the opinion of the group that government building and ownership of workmen's houses was a form of paternalism not consistent with American ideals and only to be permitted through stress of war conditions. It was made evident that large sums of money have been invested in houses in localities that will be entirely abandoned by workmen, and to salvage these investments was a matter to be carefully considered. THE AMERICAN ARCHITECT gave warning of this very condition when the hysteria to build houses in every conceivable locality was rampant. In normal times workmen choose their place of residence, and in war times only abnormally high wages draw them to undesirable localities. The housing of workmen is still and will always be a matter of paramount importance to American industries and the execution of such projects will be a matter of private or syndicate financing, satisfactory methods for which will be found to meet the demand.

Major Group 10 of Industrial Professions embraced Related Group 33 and Group 35, made of trade papers, magazines and newspapers. James J. Hory, V. P. Continental Insurance Co. of New York, was chairman. The resolutions originating in the related groups were indorsed and passed on to the Clearance Committee. At the meetings of Major Group 10 there was a larger attendance of engineers but no representation of architecture.

The influence of this convention will be felt throughout the country, as the views of the delegates were moulded into a unanimous opinion which will appear reasonable to all thinking people.

HOUSE OF L. H. H. JOHNSON, MILTON, MASS.
COOLIDGE & CARLSON, *ARCHITECTS*

Problems of Reconstruction in the Building Industry

An Address by the Hon. Wm. M. Calder, Senator from New York, before the Convention of the Building Interests of the United States, held at Atlantic City, N. J., December 6 and 7

AT your organization meeting in July, I had the pleasure of speaking to you and outlining my idea of a constructive national policy toward the building industry during the war. To-day we are entering upon a period of reconstruction.

In order to understand the problems of reconstruction which the building industry is facing, it is necessary not only to review the factors which brought about a curtailment of building during the war but to go back of that and study the condition of the industry just before the war. Even during this pre-war period there had been a gradual decline in building activities due to increasing costs of material and labor.

The history of the war orders of the past thirteen months is well known to you. The first order issued by Judge Lovett, Oct. 27, 1917, restricted the use of open cars. Then came Secretary McAdoo's demand for the cessation of all building not essential for the prosecution of the war or immediately necessary for domestic welfare, followed by the increasingly stringent rulings of the Fuel Administration, the War Industries Board and the Capital Issues Committee, and the position taken by the Department of Labor in classing building labor as non-essential. The most far-reaching orders of the War Industries Board were those affecting the building industry.

The zero hour for building came when pledges were required of all material dealers and licenses of the Non-War Construction Section of the War Industries Board for all building over $2,500. The release of building has been more rapid beginning with a more liberal attitude toward housing projects, followed by the release of building under $10,000, the general removal of restrictions and culminating with Mr. McAdoo's statement of Nov. 17, urging civil construction and instructing the Supervising Architect of the Treasury Department to proceed with Government work, and then Mr. Baruch's order of Nov. 21 releasing all restrictions.

The present conditions in the building industry are similar to conditions before the war, but more acute. Costs of labor and material are still higher. The most favorable aspect of the situation lies in the increasing shortage of buildings of all types—constituting a potential demand for construction. Deferred building is part of the war debt, that is, it must be met before we can return to normal conditions. Construction, unlike automobile manufacture, for example, is an essential industry and therefore a prerequisite to all normal business development. The natural inactivity of building in the fall and winter should give opportunity, in view of the shortage in all types of construction, for the gradual restoration of confidence in such investments, unretarded by fear because it does not come faster. The winter may also give those who are planning to build the opportunity for laying plans and choosing their materials.

The most unfavorable factor in the building outlook is the timidity of investment capital. This is a hang-over from pre-war conditions which still pervades finance. The effect of the war order of the Administration and the systematic discouragement of building by the Capital Issues Committee is still apparent. Another adverse factor is the restlessness of labor apart from the element of wages (since only 10 per cent of labor disputes in the building lines are over wages, the other 90 per cent being petty jurisdictional or breach of contract, together with inefficiency due to Government work and overtime standards). Transportation cannot be depended upon for efficient service and rates have increased to almost a prohibitive degree, although before the war 25 per cent of the carrying capacity of the railroads was devoted to building material. Finally, fuel, though released, is high and difficult to obtain, for the building industry consumes 30,000,000 tons out of the 425,000,000 tons produced by the country.

While these factors are grave and might weigh in other less essential industries, in building they are offset, first, by the necessity of immediate housing for a large percentage of the population who are suffering not only through the high cost of living induced by building shortage but inefficiency and morale as well; and second, by the encouragement which the Government is now giving building. Secretary McAdoo regards the revival of the construction industry as essential to the country's welfare in its transition from a war to a peace basis, and former Governor Hughes at a recent meeting of the Academy of Arts and Sciences has urged an immediate country-wide survey of needed public construction.

But builders who are far-seeing and able to analyze the present situation realize that public construction alone will not bring the industry back to its normal position in the life of the nation. Government construction can only help as a transition measure, while private enterprise is slowly recovering its confidence and reabsorbing labor and materials. As an ultimate solution of the building crisis, Government construction alone will fail, because at most it can constitute but a small proportion of normal building; it will not relieve the present burden of taxation; and it will not supply buildings which bring reduction of rent or afford the necessary tools of industry.

On the whole, military and Government housing construction has had an unfavorable influence on building. Government contracts have been let in large numbers. They have been let on a cost-plus basis and they have been carried out without close supervision. Abnormal war requirements have set false precedents for the cost of materials and the cost and efficiency of labor. Continued Government construction, as a substitute for private enterprise, will injure the industry. For though public work will absorb a fraction of our surplus labor and materials and thus help to stabilize the markets, it will maintain the present false standards which are now the greatest discouragement to private investment. Thus, in the long run, the total annual output of construction will not be caught up.

The remedy for these difficulties is the encouragement of private building, which shall steadily and increasingly replace public construction and as rapidly as possible take over surplus labor and material and establish the industry on a sound economic basis.

The immediate problem, therefore, which confronts the building industry is to find the means of encouraging private construction. Two methods suggest themselves. First, the co-operation of the Government should be secured not only for the development of large public work but, more fundamentally, in the encouragement of private investment. During the past year, from the time of the first restrictions on building until the day upon which the armistice was signed and rapid releases were made, the Government through a series of rulings and non-building orders carried on a vigorous publicity campaign designed to discourage all non-war construction. Now that the objects of

the war are achieved and the time has come to build up the industry again, the Government should through similar methods of publicity counteract the depressing effect which its war measures have had upon capital, and thus hasten the return of normal conditions.

Aside from the benefits which will accrue directly to the building industry through the Government's adoption of such a policy, will be its far-reaching effect on the welfare of the country as a whole. As a source of national revenue alone, the Government would do well to restore the building industry by every means at its command. Before the war the construction of the country, including increased land values because of such construction, paid more than one-half the taxes of the nation, if county, state and federal budgets were included. Before the war the industry employed over two million men, all taxpaying members of society. Since the war, the greater portion of the total annual output of construction has been deferred on account of Government restrictions, causing the loss of a sum equal to the entire estimated saving effected by price-fixing. The Government should encourage private enterprise as the only solution of the serious social problems which spring from the present high cost of living and the restlessness of labor.

But the restoration of the building industry cannot be brought about through Government encouragement of private investment alone. A second measure which it seems imperative to take in this complex period of reconstruction is the organization of the many diverse factors of the industry through a federation, flexible and yet strong and far-seeing enough to deal with the problems which are common to all branches of the industry. The very complexity of these problems to-day is evidence of the need for such unity and strength and co-operative effort as federation alone gives.

While there is an undersupply of building extending back over a period of years, there is insufficient demand to form a satisfactory basis of business, which in order to keep the industry in normal condition should amount to about two hundred and fifty million dollars per month. It presumably will be a Government policy to allow each industry to solve its own problems free from Government regulations. Industries which have been enjoying the profits and benefits of organizations through war activity are better able to solve their own problems than is the building industry under the present conditions. Unless the building industry takes on more than normal activity and produces, in addition to current requirements during the next two or three years, an additional amount of building construction equal to that which has been deferred, the country will remain in a state of arrested development.

On a basis of an armed force of four million men there are probably between fifteen and twenty millions diverted from peace to war work. If the armed force is reduced to one million men during the coming year there will be twelve to fifteen million men free for the industries of peace. The maximum labor shortage never exceeded between one and two million men and at present there is little or no shortage.

While there is less than a normal supply of materials in the hands of manufacturers, there is an oversupply in the hands of the Government which cannot be thrown on the market without breaking the market and throwing labor out of employment.

Representatives of the War Industries Board estimated that the country was producing steel at the rate of 45,000,000 tons per year (on the 1st of November); that this was practically all used for war purposes. The first half of 1918 the steel industry produced 17,000,000 tons at the rate of 34,000,000 tons annually. It is estimated that France will not need over 8,000,000 tons during the coming year, if as much. The use and sale of the surplus output must be arranged for unless the steel industry is to go into a condition of depression with unfavorable effect on labor and with sympathetic effect toward general business depression. The building industry will never absorb steel at the former rate per cubic foot, because reinforced-concrete construction has become popular and requires but one-third the steel of ordinary steel construction, with a consequent saving of labor in steel production, transportation and erection.

On the wise solution of these intricate problems involving all branches of the building industry will depend the recovery which it makes in the period of reconstruction ahead. For their solution should be marshaled the best brains of the industry, through an organization which will give expression to all aspects of these problems and functions adequately with the Department of Commerce of the Government in working out a liberal and progressive policy for the development of the industry during the next few years.

Frank A. Vanderlip Sees No General Decline in Wages

A continued great world demand for labor and the maintenance of wages at their present general level were predicted by Frank A. Vanderlip in a recent address.

"As long as the cost of living remains at its present level—and it is almost certain that it will remain there—there will be no general decline in wages," said Mr. Vanderlip. "This does not mean, of course, that some of the fantastic wages that are being paid in certain lines will continue to be paid. In the shipbuilding, munitions and other lines the wages paid in many cases have been little short of absurd. This sort of thing, of course, cannot and will not continue."

In discussing the attitude of labor, which, he said, "might very easily become ugly in the face of an attempt to force wages down," Mr. Vanderlip warned employers to meet their labor problems in a conciliatory frame of mind. Nothing save its failure properly to grasp the opportunities for helpful co-operation between capital and labor could deprive the nation of an undreamed-of prosperity, the banker declared.

Government Plans for Soldier Labor

A co-operative bureau, made up of Government, war relief, church and draft board organizations, is being formed to provide productive employment for returning soldiers. The plan was announced by a reconstruction conference under the auspices of the United States Employment Service, which will exercise general supervision of the details. The work of providing employment will be national in scope.

In providing positions to soldiers and sailors returning to civil life the wishes of the individual will be taken into consideration.

For purposes of better co-operation and more successful results it had been deemed advisable by the Government to place all agencies in the proposed work under the Government Employment Service.

It is indicated that the proffered services of the Red Cross, the Y. M. C. A., the Knights of Columbus, the Jewish Welfare Board, church and draft organizations will be accepted.

Bureaus for employment will be established in every community by members of the co-operating organizations and the United States Employment Service will act as adviser. The plans adopted also include the establishment of clearing houses of information for professional men who are being discharged from the army. Especial emphasis in the work is to be placed upon "vocational guidance" by committees which will take care of the younger men.

The valuable technical training received in many branches of the army and navy and the general elevation of personal standards of merit as a result of participation in the war should make the returning boys especially desirable candidates for positions, the conferrees suggested.

Advocates State-Owned Forests

At the second annual Michigan Land Congress, held recently in the city of Grand Rapids, Prof. Filbert Roth, of the Forestry Department of the University of Michigan, was one of the principal speakers. Professor Roth emphasized the necessity of national forest cultivation projects, citing the examples of France and Great Britain, the latter of which is considering a reforestration program involving the expenditure of $60,000,000. He briefly reviewed the great forestry system of France, pointing out that more than 10,000 French towns and villages have owned their forests almost from time immemorial, from them obtaining their timber supply from year to year.

His contention was that the forest is quite as good an investment as the farm. He showed that the gross farm income per acre in Michigan is about $6 a year, and declared that the forest would produce an income of $3 per acre, giving the farmer his fuel in addition to a crop of timber. This condition would give the railroads a chance to haul millions of tons of logs, producing four times as much business for them as livestock growing, farming, or manufacturing. It would enable a town with a large forest to support a large mill, and a community with a small forest to have a small woodworking industry.

Zoning Law Stimulates Building

The new zoning law in New York City will effectually do away with the construction of signs and billboards in the many residence districts of the city, according to Herbert S. Swann, secretary of the Zoning Committee of New York.

The effect of this in stimulating the development of idle property in residential districts is at once evident. Valuable corners and vacant lots which have heretofore been allowed to remain undeveloped as long as the taxes and overhead were paid from the revenue derived from the signs will at once

demand development or become an actual expense on the hands of the owners.

The law prohibits property situated in residential district from being put to any but the following uses and the accessory uses customarily incident to these uses:

1. Dwellings, including dwellings for one or more families; boarding houses, and hotels having thirty or more sleeping rooms.
2. Clubs, excepting clubs the chief activity of which is a service customarily carried on as a business.
3. Churches.
4. Schools, libraries or public museums.
5. Philanthropic or eleemosynary uses or institutions, other than correctional institutions.
6. Hospitals and sanitariums.
7. Railroad passenger stations.
8. Farming, truck gardening, nurseries, or greenhouses.

The term "accessory use" does not include any building or use not located on the same lot with the building or use to which it is accessory.

Billboard advertising can in no sense be deemed accessory to any of the uses specifically permitted in residential districts. The erection of signs in the future will therefore be confined to such sections of the city as are situated in business districts or unrestricted districts.

Government Is Saving

The building materials section of the War Industries Board will effect a saving of 40,000 tons of pig iron, the equivalent of about 80,000 tons of steel, through new regulations governing the use of cast-iron pipes, tanks, and accessories to be placed in Government projects under way and under consideration, according to a statement authorized by B. M. Baruch, chairman of the War Industries Board.

The regulations and conditions will be enforced by the Government, even though they may conflict with municipal ordinance, codes, or local building regulations in the communities where the Government is building. The only departure authorized is where the size or type of the structure make changes necessary, in which case special application shall be made to and the approval secured of the building materials section. The regulations will not preclude the use of existing manufactured stocks, provided the metal cannot be utilized for more essential purposes.

Nothing larger than 4-in. diameter nor heavier than standard plain cast-iron soil pipe is to be used for vertical stacks above ground; the full size stack to be carried through the roof. Portland cement concrete or vitrified clay pipe shall be used for horizontal lines under ground.

No metal pipe shall be used for water mains without special permission of the War Industries Board. This does not apply to pipe lines carrying pressures of more than 100 lb.

All water-supply tanks shall be of other material than metal.

Culvert pipes shall be reinforced concrete, burned clay, or other material than metal.

An Allied Art Salon

The Allied Art Salon, opened in New York on December 9 in the galleries of the American Art Association, is an exceedingly interesting exhibition of drawings, etchings, and paintings by artists of prominence, many of whom have held commissions in the army and navy.

Eighty paintings by American artists who have made war their theme form one group. These artists include such men as George Luke, George Bellows, Childe Hassam, Jones Lie, Albert Herter, Gari Melchors and Paul Dougherty. In this division there are also a number of paintings executed at the front by Samuel J. Woolf, and paintings of American shipyards by John C. Johanson.

Two landscape targets used in the artillery schools are shown, also lithographs, posters, and sculpture by well-known artists. Caproni has sent a number of his notable etchings of aeroplanes and the naval camofleurs show to the public for the first time their drawings and paintings. The net proceeds go to the Art War Relief.

For Building in Cuba

For construction and equipment of a building for the international trade mark registration bureau in Havana, on land fronting the new Cuban presidential palace, Secretary Lansing has suggested to Congress an appropriation of $825,000. Cuba has appropriated $25,000 toward construction and ceded the property, valued at $150,000.

"Such a home as is contemplated for the bureau," said Secretary Lansing, "would necessarily be a monument of considerable æsthetic and political value, as well as a secure and spacious edifice for the safeguarding of the precious registration records of industrial property."

For the designing of the building an international contest in which architects from all nations might take part was suggested by Mr. Lansing.

Classifications of Coal

The Geological Survey gives to coal six classications. They are: Anthracite, semi-anthracite, semi-bituminous, bituminous, sub-bituminous and lignite. All of these various classes are produced in the United States.

Most of the anthracite coal is mined in eastern Pennsylvania. Small areas of coal exist in the West that are placed in the anthracite classification, but which are not identical in quality with the Pennsylvania anthracite. Anthracite is an almost ideal domestic fuel, but is not well adapted to steam raising, although it is used for this purpose when an absolutely smokeless fuel is required.

There is very little anthracite in this country; hence it is but a small factor in the trade.

Semi-bituminous is of higher rank than bituminous. It has a high percentage of fixed carbon, which makes it nearly smokeless. It is best adapted to raising steam and to general manufacture that requires a high degree of heat. It is regarded as the best coal for steamships, and is used almost exclusively by the navy. Being a soft, tender quality, it is easily broken. This fineness is regarded by those accustomed to lump coal as detrimental, but it is not. It burns slowly and retains a high degree of heat.

Bituminous coal is produced in a number of grades, but generally speaking it describes a rank of coal having about equal proportions of volatile matter and fixed carbon. Bituminous coal is only slightly affected chemically by weathering unless it is exposed for many years.

"Sub-bituminous" is a term adopted by the Geological Survey to describe a rank of coal more generally known as "black lignite." It is produced principally in the Western States. It is a clean, domestic coal, and ignites easily.—*Merchant Plumber and Fitter.*

The Human Engineer

Dudley R. Kennedy, employment manager of the American International Shipbuilding Corporation, in an address delivered under the auspices of the American Society of Mechanical Engineers in New York, said the human engineering phase of the country's industrial development had generally been overlooked.

"We are now entering upon the war after the war," he said. "We glibly discuss the social revolutions growing out of events in Europe, but many people do not seem to see that we are going through a momentous social revolution here and now.

"We hardly yet know what competition means; we will learn it within a few years. Permit me to prophesy that the executive of the next decade will be the man who best knows men. He will be an organizer, a handler of men as individuals, a handler of men in the mass, a leader, not a driver, a very human man. The science of human engineering is here to stay. The study of human characteristics is the most enduring, as well as the most fascinating, in the world, and still the most complex."

Charles E. Knoeppel, discussing "Industrial Organization As It Affects Executives and Workers," said the problem of the cost of living might be settled in two ways: (1) There must be more producers, and (2) there must be a greater amount supplied by those now producing. The first solution is practicable, he said, if labor is allowed shorter hours, better conditions and a remuneration that will attract workers. The second can be employed by eliminating waste, standardizing conditions, setting fair tasks and allowing men to earn an amount which will compensate them for their skill and co-operation.

Quantity Surveys for Buildings

Competitive methods are more vicious today than ever. The age of efficiency in which we are at present developed, is producing many fine, high class specialists, but in reality the whole scheme is nothing but a most scientific method of price reduction. For instance, if through your efficiency man you can save a dollar a thousand in laying brick, what becomes of the dollar? The next job you figure you reduce that bid a dollar a thousand on brick and pass the result of your scientific organization work over your head back into the pockets of capital.

Out of all the chaos there finally comes a ray of light, more than a hope, a sure, time proven process that will eliminate the evils of the present day competitive menace.

This acknowledged remedy is known as the "Central Quality Survey" method. Under its guiding hand a full value and uniform competitive list of quantities can be established in any market; it gathers statistical information of inestimable value, to be in turn imparted to all. It covers costs, estimating, standardization, credits, insurance, and such legal matters as must necessarily come under its scope. It has full association powers and has proven to be a direct producer of profits for those who have had the perseverance to incorporate the work.

This method touches the fundamentals of your business; it has as its first purpose the object of

creating a full value list of quantities on each and every job. Skilled "Quantity Surveyors" draw the items off the plans, interview the architects, obtain all necessary details and information, and are held responsible to interpret actually what is going to be used on each and every job.

We all know each item on a plan represents a certain value, and every item omitted is an absolute loss. The items on a plan represent the material you will be obligated to buy, and the labor you must pay for in executing the work. Therefore, the interpretation of every plan must be as near perfect as possible, free from confusion, and the only way to stop confusion is to have a job listed by one man carefully and properly and all competitors accept this uniform and correct interpretation. In fact, it is the most economic, most efficient, most properly applied principle ever submitted to the building interests.—C. E. Flamboe in a Builder's Bulletin of the Master Builders' Association of Wisconsin.

Fuel Saving by Industrial Plants

Through the co-operation of the industrial power plants, which have thus far put into force the standard recommendations of the United States Fuel Administration to promote efficiency in the use of fuel in power plants, a saving of seven million tons annually has been effected. That is to say, in the first six months from the announcement of the national program, three and one-half million tons have been conserved, at the same time maintaining maximum production in the factories. The largest savings have been in the following States: Massachusetts, Pennsylvania, Connecticut, Illinois, New York, Missouri, Michigan, Minnesota and Wisconsin.

Some industrial plants which have adopted the standard recommendations and kept systematic records report a fuel saving as high as 25 per cent, and the average is estimated between 10 per cent and 15 per cent. This large economy is effected at practically no expense to the plant owner since the recommendations treat primarily of proper methods of firing and management in power plants.

For the efficient execution of the program of industrial conservation, under the plan developed, the engineers of the country have been mobilized through the professional societies and the operating engineers and firemen, and as a result there are today fifteen hundred volunteer engineer specialists and power plant men, organized by States, inspecting power plants, classifying them according to their operating efficiency, and aiding the work of rapid development. As a direct result of the operation of this plan, it is estimated that the total annual saving throughout the country will be about twenty-five million tons of coal without reducing the output of the factories. Special printed material, instructing on the proper use of fuel, has been prepared by the United States Fuel Administration, and may be obtained free of cost upon application.

Italy Preparing for Reconstruction Period

Italy has started on a definite reconstruction program, and nearly 3,500,000,000 lire ($665,000,000) have been appropriated to carry it out, according to an official dispatch of November 20 from Rome. Measures have been adopted to permit all war factories to resume peace production immediately. One billion, eight hundred million lire have been designated for railway reconstruction; one billion for public works and drainage of harbors; five hundred million for other works of public utility, and one hundred million to cope with the situation created by the large number of unemployed.

Personals

It is announced that Mr. H. F. Kuehne, C. E., B. S., A. I. A., will succeed the firm of Kuehne & Chasey, and continue the practice of architecture at 826 Littlefield Building, Austin, Texas.

Charles Deas, formerly chief draftsman for John Gaisford, architect, Memphis, Tenn., has opened an office for the practice of his profession at 506 Goodwyn Institute Building, Memphis, Tenn. Mr. Deas requests that catalogues and samples be sent him.

Department of Architectural Engineering

Effect of Time of Mixing on the Strength of Concrete*

By Prof. Duff A. Abrams
Structural Materials Research Laboratory, Lewis Institute, Chicago

Part II

Methods of Testing

The compression tests of concrete were made in a 200,000-lb. Olsen universal testing machine. A spherical bearing block was used on top of the specimen. Stress-deformation measurements were made from which the modulus of elasticity of the concrete can be computed. These values are omitted from the present article.

Wear tests of concrete were made in the Talbot-Jones rattler. The test pieces consist of blocks 8 in. square and 5 in. in thickness. The blocks are arranged around the perimeter of the drum of the rattler, as shown in Fig. 1. Ten blocks constitute a test set. The ten-side polygon formed by the test

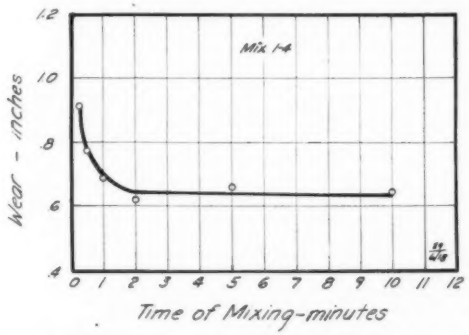


FIG. 6—EFFECT OF TIME OF MIXING ON THE WEAR OF CONCRETE

Series 89—Age 2 mo. Each value is the average of 30 tests, 5 each from 6 different consistencies.

blocks presents a nearly continuous surface. The outside diameter of the polygon thus formed is 36 in. and the inside diameter 26 in. During the test the front of the chamber is closed by means of a light steel plate. The abrasive charge consists of 200 lb. of cast-iron balls (about 133 1⅞ in. and 10 3¾ in. in diameter). These balls conform to the requirements for the standard rattler test of paving brick of the American Society for Testing Materials.

The test consists of exposing the inner faces of the concrete blocks to the wearing action of the charge for 1800 revolutions at the rate of 30 r.p.m. The machine was run for 900 revolutions in one

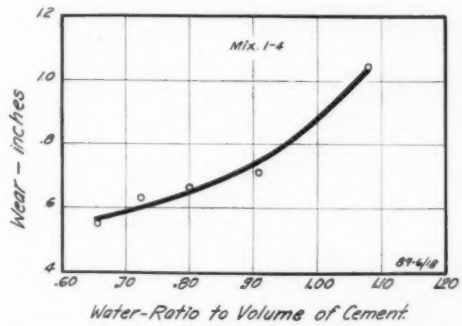


FIG. 7—INFLUENCE OF WATER ON THE WEAR OF CONCRETE

Series 89—Age 2 mo. Each point is the average of 30 tests, from 6 different times of mixing.

direction, then reversed. Each block was weighed upon removal from the form, upon removal from the damp sand, immediately before and after testing. The loss in weight during the test is used as a measure of the wear. This loss is reduced to an equivalent depth of wear in inches.

Data of Tests

Most of the data from the tests have been platted in diagrams. In several instances curves have been platted for only a portion of the values; for instance, more emphasis has been given to the 28-day than to the 7-day tests.

Owing to numerous instances of overlapping in the different test series it seems best to discuss the data under several headings, instead of taking up each series separately.

Effect of Consistency on the Strength of Concrete

The remarkable influence of the quantity of mixing water on the strength and other properties of

*Continued from our issue of December 11, 1918, page 717.

the concrete has been demonstrated very forcefully in all series in which variations in consistency were introduced. Owing to the importance of this factor in any consideration of the tests, the discussion of the effect of consistency is given first.

Many different methods have been used for indicating the consistency of concrete:

(1) Total water as a percentage of the weight of the dry materials.

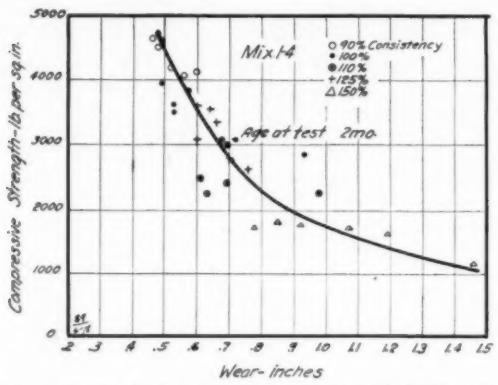


FIG. 8—RELATION BETWEEN STRENGTH AND WEAR OF CONCRETE

Series 89—Each point is based on 4 compression tests and 5 wear tests from the same batch. Compare Fig. 9 from a series of tests on hand-mixed concrete.

(2) Total water as a percentage of the weight of the finished concrete.

(3) Total water as a percentage of the weight of the cement.

The first method is the one which is universally used in cement and mortar tests. In the tests made in this laboratory we have preferred to express the water in terms of the volume of the cement, considering 94 lb. of cement as 1 cu. ft. This method of indicating the water content of concrete is not essentially different from (3). However, since volumetric measurements are used for cement and aggregate, it seems desirable to use volumes for the water also, for sake of uniformity. Methods (1) and (2) above are objectionable, since with the same quantity of water, widely different values are obtained, due to variation in the unit weights of the aggregate.

Under "Test Pieces" is a list given of the factors which determine the quantity of water which must be placed in the batch. Remember that all of the water used should not be credited to the cement; a certain quantity will be absorbed by the aggregate. In some instances the absorbed water is a considerable proportion of the whole amount. The water absorbed by the aggregate should be deducted in computing the volume of water which affects the action of the cement.

For given concrete materials (that is, cement, water and aggregate) the amount of water which affects action of the cement may be varied in the following ways:

(1) For the same mix and same grading of aggregate use different quantities of water, thus producing concretes of varying degrees of "wetness."

(2) Change the quantity of cement (the mix) with the same grading of aggregate, mixing to the same plastic condition. The richer mixes will, of course, require a smaller percentage of water as compared to the cement than the lean mixes.

(3) With the same mix and the same relative plasticity, change the grading of the aggregate from coarse to fine, etc. The mixes with a preponderance of fine material will require most water.

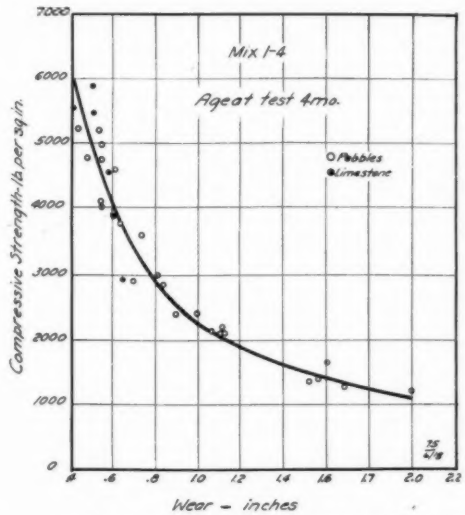


FIG. 9—RELATION BETWEEN STRENGTH AND WEAR OF CONCRETE

Series 75—Data similar to Fig. 8; 1-4 hand-mixed concrete; age 4 mo. Each value is based on 5 compression tests and 5 wear tests. Detailed data from Series 75 (Effect of Consistency and Curing Conditions on the Wear of Concrete) not given in this article.

(4) Any combination of two or all of the above methods may be used simultaneously; for instance, we may wish to compare a stiff 1-2 mix, using sand graded 0-28 with a wet 1-5 mix, using aggregate graded 0-1½ in.

In (4) every factor which affects the strength (the quantity of cement, grading of aggregate and relative consistency) has been changed. It will be shown below that in all cases we have a common basis for comparison of strength in the "water-ratio" of the batch; that is, the volume of water, in terms of the volume of the cement in the batch using one sack of cement (94 lb.) as the equivalent of 1 cu. ft.

In Series 89 the mix and grading of aggregate were maintained constant, but the water content was varied from a rather stiff mix to a very wet one. In this series both compression and wear tests were made. The influence of water on the strength of concrete in this series is shown in Fig. 4. It is seen that the strength decreases with the water content. The path of these curves may be expressed by an equation of the form,

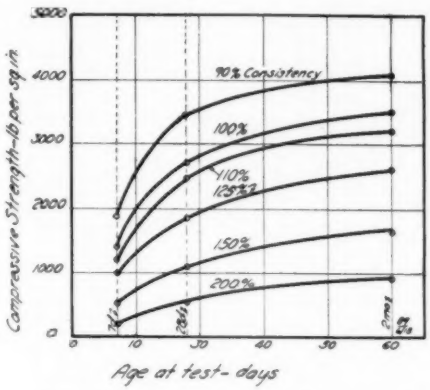


FIG. 10—EFFECT OF AGE ON THE STRENGTH OF CONCRETE

Series 89—Each point is based on 24 tests obtained from averaging 6 times of mixing. Compare Figs. 11 and 18.

$$S = \frac{A}{B^x} \quad - \quad - \quad - \quad (1)$$

Where S = compressive strength at a given age.
x = water ratio of the cement.
A and B are constants for a given cement and given conditions of test.

A similar set of curves is platted in Fig. 5, a separate curve being drawn for each age. The change in water content in this series was made in accordance with method (1) mentioned above.

In Series 93 the water content was varied on account of differences in the mix, using aggregate of a given grading, and also due to differences in the grading, using concrete of a given mix. In both instances the concrete was mixed to the same plasticity. The influence of water on the compressive strength in this series is shown in Figs. 16 and 17. Separate curves are drawn for the hand-mixed and machine-mixed concrete. It will be noted here that exactly the same relation exists as was pointed out above in Series 89. The variation in the water content in these tests was made in accordance with methods (2) and (3) mentioned above. Figs. 24 and 30 show the same influence of water on the strength of concrete from still other series of tests. The curves in Fig. 30 are sensibly straight lines, since the range of consistencies is very narrow. It is the narrow range in consistencies which has been generally used in tests that has led to the erroneous conclusion that the strength of concrete is a linear function of the amount of water used. The relation is, of course, sensibly a linear one for any narrow range in consistency. This means simply that the tangent to any point of the curves in Figs. 4, 5, etc., is sensibly the same as the curve if only a short arc is considered. The true relation for all parts of the range is given by equation (1).

The water content expressed as a fraction of the volume of the cement in the batch is the only satisfactory criterion for strength of concrete made up of given materials mixed in widely different proportions. It will be seen from the tests included in this article that *it makes no difference why the water content is changed; the result is exactly the same in the end.* This change in water may be due to changing the plasticity of the mix or the use of richer mixes or aggregates of different gradings, or combinations of these factors. The influence of water on the strength of concrete discussed above has been brought out in the same way by probably a dozen different series of tests carried out in this laboratory.

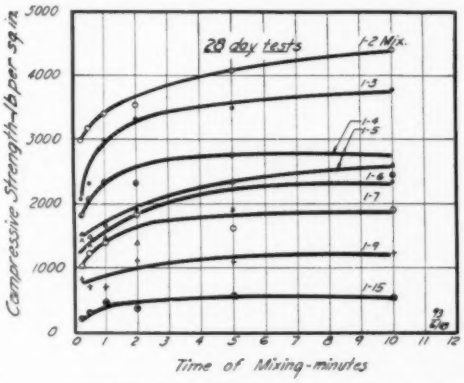


FIG. 11—EFFECT OF TIME OF MIXING ON THE STRENGTH OF CONCRETE

Series 93—All aggregates graded 0-1¼ in. Each value is the average of 4 tests. Similar curves may be drawn for tests at 7 days. For similar tests at 3 months see Fig. 12. Compare Figs. 3, 12, 13, 14 and 15.

Equation (1) given above may be considered as expressing the law of concrete strength for variations in the proportions of given lots of cement, aggregate and water. This law is subject to the following limitations:

(*a*) Mix not so wet that the mixture of cement and aggregates cannot retain all the water.

(*b*) Mix not too dry for maximum strength for the condition under which the concrete is placed. (That is, the concrete is in a plastic condition.)

(*c*) Aggregate grading not too coarse for maximum strength with the quantity of cement and water used.

Of these limitations (*a*) is the only one which is usually encountered in concrete work. In mixes so wet that all the water is not retained, the strength will be a little higher than the equation indicates. However, this condition does not prevail until mixes are reached which are so wet that extremely low strength will be secured anyhow. Before a mix becomes too dry for maximum strength, it is so harsh-working that this limitation is not encountered except in concrete products plants where machine molding is done. It is seldom that the aggregates

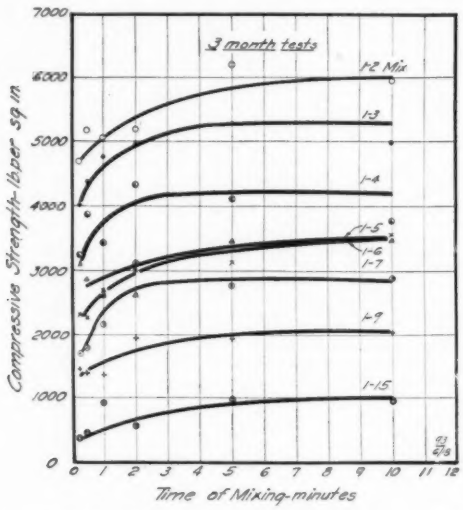


FIG. 12—EFFECT OF TIME OF MIXING ON THE STRENGTH OF CONCRETE

Series 93—3-mo. tests, similar to Fig. 11. A set of curves of the same kind may be platted for the 7-day tests. Compare Figs. 3, 11, 13, 14 and 15.

are graded too coarse for the limitations of this law, for the same reason as given for the dry mixes.

Table 6 shows the influence of water on the strength of concrete for a typical case. The values in the table are about what would be expected from a well-graded mix of 1-4 (or in usual terms 1-1½-3 or 1-2-3) concrete.

These tests give us an entirely new conception of the function performed by the various constituent materials. The use of a coarse, well-graded aggregate results in no gain in strength unless we take advantage of the fact that the amount of water necessary to produce a plastic mix can be reduced. In a similar way we may say that the use of more cement in a batch does not produce any beneficial effect except from the fact that a plastic, workable mix can be produced with relatively less water.

The reason a rich mixture gives a higher strength than a lean one is not that more cement is used but because the concrete can be mixed (and usually is mixed) with a quantity of water which is relatively lower for the the richer mixtures than for the lean

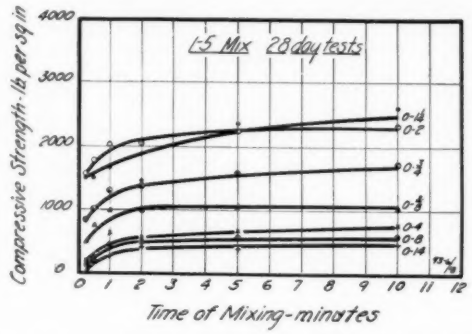


FIG. 13—EFFECT OF TIME OF MIXING ON THE STRENGTH OF CONCRETE

Series 93—1-5 mix, 28-day tests, different gradings of aggregate. For similar tests at 3 months see Fig. 14. Compare Figs. 3, 11, 14 and 15.

ones. If advantage is not taken of the fact that in a rich mix relatively less water can be used, no benefit will be gained as compared with a leaner mix. In all this discussion the quantity of water is compared with the quantity of cement in the batch (cubic feet

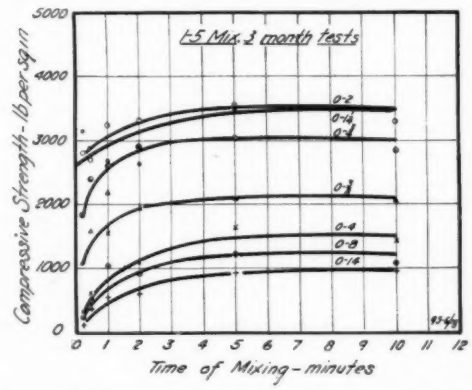


FIG. 14—EFFECT OF TIME OF MIXING ON THE STRENGTH OF CONCRETE

Series 93—3-mo. tests, similar to Fig. 13. Compare Figs. 3, 11, 13 and 15.

of water to 1 sack of cement) and not to the weight of the dry materials or of the concrete as is generally done.

The mere use of richer mixes has encouraged a feeling of security, whereas in many instances nothing more has been accomplished than wasting a large quantity of cement, due to the use of an excess of mixing water. The universal acceptance of

this false theory of concrete has exerted a most pernicious influence on the proper use of concrete materials and has proven an almost insurmountable barrier in the way of progress in the development of sound principles of concrete proportioning and construction.

Rich mixes and well-graded aggregates are just as essential as ever, but we now have a proper appreciation of the true function of these materials, and a more thorough understanding of the injurious effect of too much water. Rich mixes and well-graded aggregates are, after all, only a means to an end; namely: to produce a plastic, workable concrete with a minimum quantity of water as compared with the cement used. Workability of concrete mixes is of fundamental significance. This factor is the only limitation which prevents the reduction of cement and water in the batch to much lower limits than are now practicable. The importance of any method of mixing, handling, placing and finishing concrete which will enable the builder to reduce the water content of the concrete to a minimum is at once apparent.

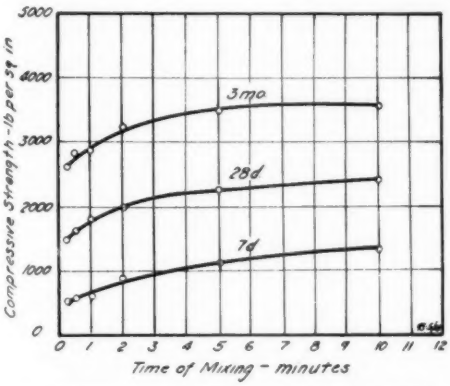


FIG. 15—EFFECT OF TIME OF MIXING ON THE STRENGTH OF CONCRETE

Series 93—Grand average for all times of mixing for 0-1¼-in. aggregates, regardless of mix. Compare Figs. 3, 11, 12 and 14.

If equation (1) is interpreted literally we should be led to the conclusion that the concrete increases in strength as the water ratio is reduced up to the point where no water is used. This, of course, is not the case since mixes so dry as to be non-plastic will show a falling off in strength. The quantity of water which will permit only a trace of moisture to be brought to the surface gives the highest strength. The water-ratio which gives this result will depend upon the amount of cement (the mix), the grading of the aggregate, manipulation, etc. Definite maximum points are secured in the water-strength curves if the tests are carried to drier and drier mixes. From the maximum the strength falls off rapidly for either more or less water. The maximum strength occurs for usual conditions at a relative consistency of 85 to 90 per cent, based on the method of determining consistency used in these tests. For a typical water-strength curve, showing values for dry mixes, see *Concrete Highway Magazine*, April, 1917.

Few engineers or contractors fully realize the injurious effects produced by using too much mixing water in concrete. We frequently hear the following arguments in favor of the very wet mixes:

(1) Excess water does no harm since it runs off and evaporates.

(2) While very wet concrete is weak at early ages it gains in strength more rapidly than the drier mixes.

(3) The richer mixes used in reinforced concrete buildings and in road construction are less affected by excess water than ordinary mixes.

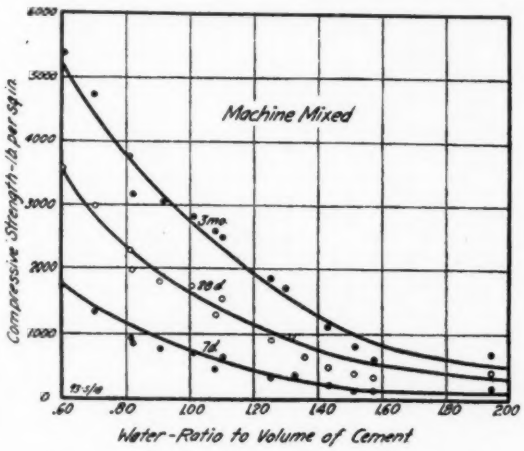


FIG. 16—INFLUENCE OF WATER ON THE STRENGTH OF CONCRETE

Series 93—Includes all tests of machine-mixed concrete in Series 93. Each point is the average of 6 different times of mixing for each mix and grading. Compare Figs. 4, 5, 17, 24 and 30.

Let us examine these statements in view of the tests included in this report. The excess water does not run off until such a quantity has been used that all of it cannot be held by the concrete. This condition comes at about 200 per cent relative consistency, that is, about double the water used for concrete of good quality. At this consistency we find a strength of about 20 per cent of what should be secured. There was every opportunity for the water to run off in these tests. Some of the water evaporates but it has already done the damage.

It was formerly believed that there was no truth in claim (2). It now appears from these tests that the wetter mixes do increase in strength somewhat more rapidly than the drier ones, but the difference

in rate is not of sufficient importance to justify placing any confidence in this claim. A slight difference in rate cannot counteract a handicap of 300 to 400 per cent in strength due to too much water in the original mix.

The exact interpretation of claim (3) hinges entirely on what constitutes excess water. For a given increase in quantity, that is, a certain number of pints, the richer mixes are more affected than the lean ones. This is shown by the steeper slopes of the curves in Fig. 5, etc., for the drier mixes or the mixes which for any reason have a lower water ratio. The effect which would be produced by a given change in plastic condition for rich or lean mixes would depend on many other factors. There is no reason to believe that the conditions would ever be noticeaby more favorable in the rich mixes.

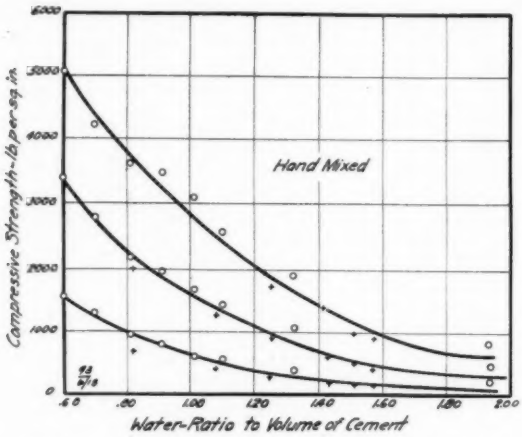


FIG. 17—INFLUENCE OF WATER ON THE STRENGTH OF CONCRETE

Series 93—Hand-mixed concrete in Table 5. Age at test 7 d., 28 d., and 3 mo. Each value is the average of 4 tests made on different days. Compare Figs. 4, 5, 16, 24 and 30.

The only safe rule to follow is to use the smallest quantity of mixing water which will give a plastic or workable mix, then provide plenty of moisture for the concrete during the period of curing which follows setting and hardening of the cement.

The reason for the injurious effect of too much water in concrete is undoubtedly found in the fact that the particles of cement are pushed farther and farther apart and from the aggregate particles to which they should adhere as water is added to the batch. Soon a condition is reached where practically no strength is obtained. If the water content is increased to three or four times the volume of the cement, the strength is negligible (whether in neat cement or concrete). Beyond this range the mass never hardens. The cement is fully hydrated, but it offers no resistance to stress. In this instance the particles have been separated beyond the range of molecular action. These considerations furnish a method of determining the law of molecular attraction for a material of the nature of portland cement.

(To be continued)

Useless Waste in Concrete Construction Due to Legal Requirements*

By W. Stuart Tait, *Assoc. M. Am. Soc. C. E., Assoc. Mem. Inst. C. E.*

Uses of the Structure

UNDER the ordinances of the city of Chicago buildings are divided into nine classes, as follows:

Class 1. Warehouses, factories and garages.
Class 2. Offices, hotels, hospitals.
Class 3. Residences.
Class 4. Churches, halls, small theaters.
Class 5. Large theaters.
Class 6. Apartments.
Class 7. Stores.
Class 8. Schools.
Class 9. Police stations.

The first two divisions include all classes of buildings with which this series of articles will deal, and the bulk of the buildings affecting the cost of our manufacturers fall under Class 1.

The Chicago ordinance requires that all structures in Class 1 shall be designed for a minimum floor load of 100 lb. per square foot, and that those in Class 2 be designed for a minimum of 50 lb. per square foot. These two limitations are entirely reasonable. Another section of the ordinance requires that all buildings in Class 1 shall be placarded prominently with the load for which the floor is designed. In addition to this, periodic inspections are made by the building department to see that the floors are not being overloaded. These clauses are excellent safeguards against the misuses of warehouses and similar buildings, and should be incorporated in all building codes and enforced by the building departments. Their enforcement protects the designer of a building and makes it unnecessary for him to take into consideration overloading of the construction on account of possible uses to which the structure may be put years after it was designed by him for some specific purpose. We all realize, of course, that a certain amount of overloading is liable to occur at times even under supervision such as that outlined above, but the

*Continued from our issue of December 11, 1918, page 718.

limitation placed on this loading by the actual clear story height is a safeguard which comes into play. Overloading of a floor is more liable to occur in a warehouse than in any other manufacturing building. Most general storage warehouses are designed for floor load of 250 lb. per square foot. Some warehouses, of course, are designed for considerably greater loads than this, but they are usually warehouses designed for a particular purpose.

The tabulation given below shows the weight per cubic foot of a great variety of materials, and is taken from "The Naval Constructor," by Simpson. In the case of ship cargoes, where the number of cubic feet of space occupied by the cargo is a very important point in determining the freight charges, the weight of material in bags and other packages has been examined with far more care than is usual in arriving at the weight per cubic foot of commodities when considering warehouse storage.

	Lb. cu. ft.		Lb. cu. ft.
Almonds, shelled	32	Iron, corrugated sheets	62
Apples in boxes	25	Kegs of steel	110
Bacon in cases	35	Kegs of nails	72
Beans in bags	33	Leather in bales	25
Beer in casks or cases	30	Milk, condensed, in cases	50
Books	45	Shelled nuts in bags	35
Buckwheat in bags	35	Oatmeal in sacks	35
Butter in cases or kegs	32	Oil in casks	37
Candles in boxes	40	Olives in casks	33
Candy	42	Oysters in barrels	37
Carpet in rolls	28	Paint in drums	160
Cement in bags	85	Peas in bags	45
Cheese	32	Pineapple, canned, in cases	37
Coffee in bags	37	Potatoes in bags	41
Corn in bags	44	Rice in bags	48
Creosote in casks	38	Rice meal	36
Currents in cases	45	Sago	41
Dates	55	Salt in barrels	43
Earthenware in crates	48	Soap in boxes	49
Fish in cases, iced	38	Soda in bags	39
Flour in barrels	38	Starch in cases	28
Flour in bags	48	Sugar in bags	49
Fruit, average	30	Sugar in casks	38
Hams in barrels	32	Syrup	65
Herrings in barrels	38	Tallow in barrels	38
Iron, pig, well stowed	224		

Adding up all of the weights per cubic foot of these commodities it will be found that the average weight per cubic foot of all of these items is 48 lb. By looking over the list also it will be observed that this average weight is only exceeded materially in six instances. These six instances include cement, paint and certain steel products. Now, cement in bags is a commodity which is seldom carried in a general storage warehouse; in fact, the narrow margin of profit in its sale precludes the stacking of it to considerable height in warehouses of reinforced concrete construction. The same remarks would apply to pig iron. I would like to call attention to the fact that this weight given for pig iron is indicated as for *well stowed* material. In the case of the Western Newspaper Union Building test in Chicago, a load of 900 lb. per square foot was applied to the floor by means of pig iron, and this loading was carried to a height of about 6 ft., giving a weight per cubic foot for ordinary stacking of about 150 lb. It is interesting to note in passing that this floor slab in the Western Newspaper Union Building, constructed some ten years ago, safely sustained a load of 900 lb. per square foot, where, under existing building ordinances, this slab would not be approved for above 125 lb. per square foot. The report of this test shows that even under this load the construction had not reached its elastic limit. The maximum steel stress mentioned in the report is 57,300 lb. per square inch, while the average stress in the steel in the region of maximum stress around the central column of four loaded panels fell considerably below the elastic limit of the material.

By referring again to the tabulation of loads given above and keeping in mind the fact that in few warehouses is it possible to pile material in excess of 8 ft. in height, and also keeping in mind the fact that it is not economical to stack commodities much higher than this, it will be observed that except in the six instances mentioned 8 ft. of load will rarely exceed 450 lb. per square foot. Present-day practice treats both the live and the dead load together, and requires the same factor of safety on both. In heavy building construction, such as warehouses, the type of design known as flat slab construuction is used in the majority of cases on account of its economies. In practically all heavy warehouse construction the dead load is about one-third of the live load. Thus, under Chicago ordinance, with a 17-ft. sq. panel and a live load of 250 lb. per square foot, we would have a dead load of 80 lb. per square foot, making a total dead and live load of 330 lb. per square foot. The worst overloading that we would expect on a floor of this kind would be the superimposed load of 450 lb. per square foot as outlined above. Adding this load to the fixed dead load of 80 lb. would give a total load of 530 lb. per square foot, and a factor of safety to be applied in the design to provide for this possible overloading would be approximately 1½. Provided, therefore, that warehouse con-

struction is placarded as outlined above and periodically inspected, it would seem safe to assume a provision in the factor of safety of 1½ to allow for overloading the construction. I would like also to draw attention to the fact that in monolithic concrete construction the panels surrounding any panel under consideration will assist materially in load carrying, even though such panels might not be directly under the applied load. Owners or occupants of buildings do not make a practice of overloading large areas of their buildings. If, therefore, overloading takes place it is highly probable that this overloading would not occur in many adjacent panels, and as a result in the carrying of the overload the surrounding panels may materially assist.

In most factory designs all of the machines to be installed in the structure are laid out before the structure itself is developed, and this mode of procedure will become even more general than it is to-day as manufacturers realize the necessity of planning factory operations more efficiently. Having the machine layout, the engineer can easily determine the uniformly distributed floor load which the applied machine load is equivalent to, and it is a fairly simple matter to make due allowance for any impact which may occur. It has been the writer's observation also that this allowance for impact in concrete construction has in the past been made in a more liberal manner than is actually necessary. In factory construction the majority of the load coming on a floor is the weight of the machine fixed in a more or less permanent manner on the floor. Rearrangements, of course, take place from time to time in most manufacturing plants, but no factory superintendent would place vastly heavier machines on a floor than had previously been there without referring the matter to the management, who, in turn, would discuss the rearrangement with their engineer. The posting of load cards on factory floors is also a reliable safeguard in this direction. It would therefore appear that a factor of safety of 1½, as suggested for warehouses, would easily provide for a possible lack of knowledge of the exact effect of impact on the structure and also for a possible slight modification of the original layout when the machinery is installed.

In concrete factory and warehouse construction there is practically no condition of loading possible which, except in entirely unusual structures, could possibly result in an entire reversal of stresses. This possibility, therefore, needs no provision in the factor of safety ordinarily used. Special conditions under which this might arise would be apparent to any engineer engaged in the design of such an unusual member of the construction, and would be adequately provided for.

In the early days of reinforced concrete construction many engineers considered that the straining of concrete construction, due to a continued series of loading and unloading, would gradually break down the construction through cracks being developed and gradually increasing in size. We have recently witnessed, however, the execution of concrete ship construction, and it is the writer's opinion that when the tests now being carried on in the development of this class of design are published that many of us will change our opinions vastly on concrete construction. In a recent technical journal an extract from an address by R. J. Wig, of the Concrete Division, Emergency Fleet Corporation, is published. While this extract does not give any very definite results of the tests still being carried out, it gives an indication of what we may expect from them. For instance, in one test that is being carried out a beam is loaded alternately with upward and downward pressures at the rate of about thirty-six load applications per minute. These loads are such as to develop stresses in the steel of about 23,000 lb. per square inch. The article states that up to August, 1918, 746,000 applications of the load had been made, and that up to this time no perceptible increase in the steel or concrete stresses had occurred after 1,000 load applications. It also states that the cracks occurring in the concrete at this stress in the steel reached a maximum only of 1/100th of an inch in width and that the continued loading did not appear to increase the width of these cracks. The beams thus tested, of course, were designed to resist tension of either the upper or the lower side, but the test would seem to demonstrate thoroughly that concrete construction does not deteriorate under repeated load, provided, of course, that the loading does not reach the elastic limit of the steel.

The writer cannot help but feel that in determining the working stresses now established in concrete design the originators of these stresses felt that it was necessary to provide to a certain extent for the deterioration of the structure due to repeated loading. As a matter of fact, in the last ten years we have learned that reinforced concrete construction increases materially in strength with age, and since the loading of the structure does not detract from its strength there is no reason whatever to provide in the factor of safety for any deterioration. It would appear, therefore, that the total factor of safety that was necessary to provide for clauses 1 and 5 set down in the previous article would be 1½.

(To be continued.)

Industrial Information

In this Department there is published each week information as to the development of materials and methods, derived from reliable sources.

Whittall Rugs

The value of good advertising and the high degree of excellence reached in the mechanical art of printing are very well illustrated in a pamphlet issued by M. J. Whittall Associates, Worcester, Mass. The pamphlet illustrates and describes the line of rugs manufactured by this corporation, which in color and texture compare favorably with hand-made Oriental rugs, and are to be had at much smaller cost. The special advantage to be derived from the use of rugs has been mainly in the beautiful effects of color produced by the difficult task of weaving, and while the Eastern hand-made rug will always be dear to the collector, the many people who are as well educated in color, but have shorter purses, can gratify this color sense in the most economical way by the use of the line of rugs so very well illustrated in this pamphlet.

The warmth and richness imparted by fine rugs produces a decorative effect in building interiors which is generally appreciated. The Whittall rugs are domestic, produced by machinery. It is therefore possible to secure greater durability at less cost. Anyone who will thumb over this booklet will further be impressed with the artistic excellence of the designs and patterns of Whittall rugs. He will find many illustrations done to simulate the actual rich tones of the rugs. One full page is of particular interest in that it is devoted to an interior especially pleasing architecturally, and which also shows considerable skill in the printer's art.

A less pretentious folder accompanies the booklet, and discusses amply and interestingly the history and present processes of rug-making. This answers many of the questions on which laymen are likely to seek information from their architect, and will enable him to give simple and direct replies on a subject little known and much appreciated.

Improving Telephone Service

Few agents are of more importance to the average business man than his telephone, and few are more abused for their involuntary helplessness.

By way of saving time, energy and temper, the Standard Appliance Co. of America, 376 Lafayette Street, New York, has placed on the market what seem to be two very valuable devices. These are the Privaphone and the Weilaphone. The former has for its object the elimination of the telephone booth with all its attendant inconvenience and discomfort. It is simply an appliance of the same material as the mouthpiece for attachment to that part of the telephone. It is shaped like the base of a horn and the mouth fits into it. Your conversation is then as difficult to hear as if you were enclosed in a booth, and you may say what you want and when you want regardless of who is present. If you have long enough been embarrassed by discussing, or obviously avoiding, personal and confidential matters while telephoning within the hearing of others, privacy may be yours, and without the discomfort, wasted space, and installation cost of a booth and additional extension, and without leaving your desk every time you want to use it. Of course it has obvious uses in the home as well.

The Weilaphone, on the contrary, instead of primarily making outgoing messages quiet, magnifies the sound of incoming ones. For long distance use it is especially important, clarifying and making distinct the words coming over the wire. By its use, a local call sounds like a face-to-face conversation. It is not an attachment, which would be against the rules of the telephone company. One places the receiver on the base of the Weilaphone, which amplifies the sound. To this is attached a rubber tube which branches out in two parts to reach to the ears. This directs the sound into both ears as nature intended; it shuts out extraneous sound; it gives freedom of both hands. For these reasons it would seem well worth while for architects to investigate. Each of these devices costs $10, but the convenience they give would doubtless soon compensate for this first expense.

Cast Stone

The commercial importance and artistic excellence of cast stone for use in building construction are both extolled in an interesting account of the development of this industry published by the Atlas Portland Cement Co., New York and Chicago.

Cast stone is produced by pulverizing natural stone to make cement. This cement is mixed with aggregate—gravel, crushed shells, sand, or crushed stone of any sort. Water is then added until the consistency may be molded into a desired shape. On hardening, an object of stone is evolved, the color and form of which might have been varied at

will, the density and hardness of which may be much greater than natural stone, and the surface of which may be treated just as natural stone, and in other ways as well.

Thus there are secured color and texture control and a temporary plasticity which enables it to be worked with the minimum amount of labor. By reason of these qualities alone, cast stone appears to be worthy of the respect of the architect. In addition there are elements of convenience and speed in production which also commend its use. It is not necessary to transport large uncut blocks of stone over long distances; the raw materials which enter into cast stone are generally close at hand.

Cast stone is not offered as a substitute where delicate veinings of marble or granite are wanted, or where the skill of the craftsman stone cutter is desired. But where a material is required whose color may be controlled at will, whose texture may be varied, whose form is easily adaptable, whose hardness and density yield very great durability, here cast stone may be resorted to with confidence.

The Atlas Portland Cement Association has issued a pamphlet giving this information, which is illustrated by photographs of important structures the country over, built of cast stone and designed by representative architects.

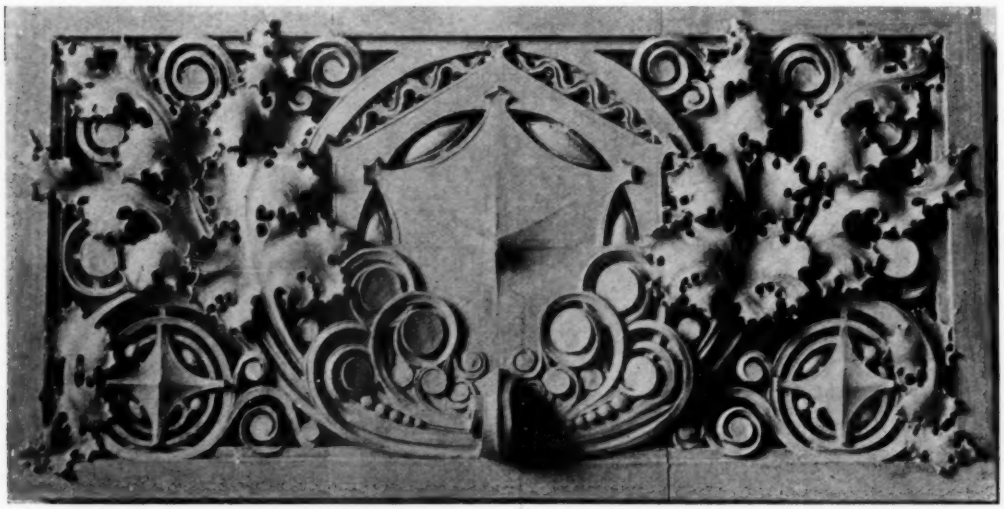
Cast stone is nothing more than the result of actual laboratory experiment. A representation of this kind thus again indicates the importance of exploration in new and untried fields of research.

The Super-Towel

A survey of the advantages to be derived from the use of Airdry as a substitute for towels in public lavatories would seem to urge its installation in every building managed by progressive people.

It is a familiar sight to see the average lavatory littered with used towels, either linen or paper. Airdry overcomes this disorderly condition, at the same time reducing both fire hazard and janitor service. It also eliminates the possibility of clogged waste pipes.

Airdry is an electrical appliance consisting of a white enameled iron standard with an adjustable nozzle for directing the flow of air. It is operated by pressure with the foot on a pedal at the base. This action releases warm air from the nozzle, which causes evaporation and dries the skin thoroughly in about thirty seconds. It consumes about 1 1/3 kilowatts an hour. The cost of operation for each person is estimated at 3/100 cents, or one hundred operations for three cents. This is far less than the cost of towels of any description. It will also be noted that the cost of laundering is eliminated.

Airdry can be installed wherever electric current is available. It occupies but little space and adds to the appearance of any lavatory. It is obviously entirely sanitary in its every aspect.

This appliance is manufactured by the Groton Electrical Devices, Inc., Groton, N. Y., and is worthy of appreciation.